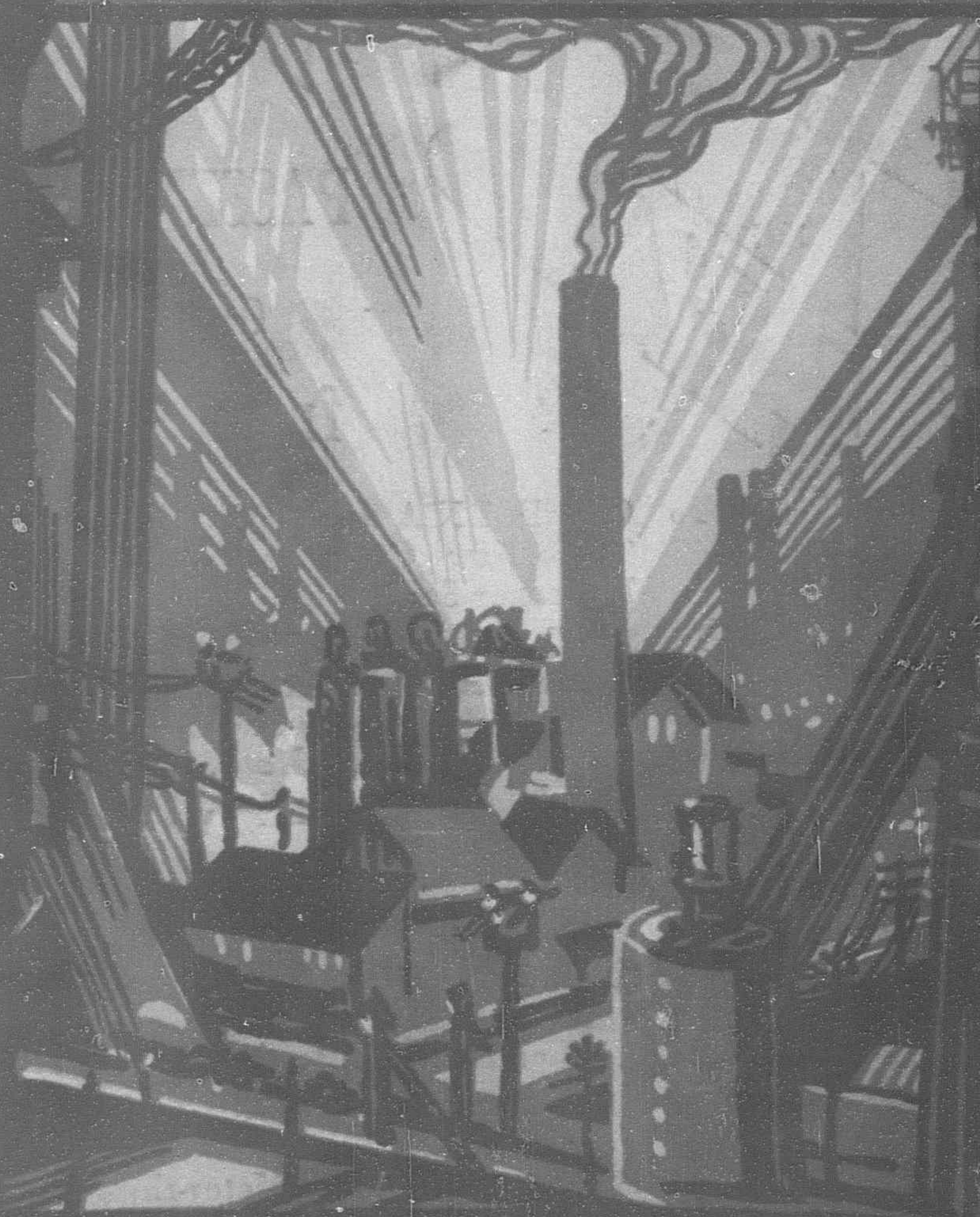


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The Far Eastern Review

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"A Fair Field and No Favor"

Baron Shidehara Key-notes Japan's New Economic Policy

A BRITISH Economic Mission is now in Japan to investigate the possibilities for the expansion of British trade with that country. The mission, headed by Sir Ernest Thompson, was welcomed officially by Baron Shidehara and the leaders of Japanese finance and commerce at a dinner held at the Peer's Club in Tokyo. In his welcoming address, Baron Shidehara keynoted Japan's attitude towards world economic problems, placing before the representatives of British commerce and industry the fundamental facts of a situation that must be squarely faced if there is to be a return to world prosperity and international concord. Japan's policy is to live and let live. She asks in return a fair field and no favor, in strict accord with British traditions and British character. Baron Shidehara's speech follows:

"We are assembled here to offer our heartiest welcome to a mission from the United Kingdom—a country to which Japan is bound by such strong ties of friendship and of interest, and in which I spent so many happy days at an earlier stage of my diplomatic career. We all feel very highly complimented by your visit of courtesy and of observation. You represent economic activities having a world-wide influence and prestige. I trust you will find that it is open to the two nations to put forth their utmost efforts in trade and industry, to the mutual advantage of both parties.

"I am perfectly sure that the merchants and manufacturers of Japan entertain no such vain and illusory expectation as that of monopolizing the market in any quarter of the globe. They only seek to enjoy in the open markets of the world their fair share of business, in an honest and honorable competition. Such a competition can only make for the common good of mankind. So long as this

equal opportunity is not denied to our people, there should be an ample field for friendly and fruitful co-operation between British and Japanese interests in all directions of economic development.

"Vast markets are springing up, through the giant growth of the South American States; the rapid advancement in civilization of those African regions which half a century ago were wholly unknown in this country, and where the maps of your grandfathers would have only noted 'Here be elephants'—and the ferment of new ideas among four hundred millions of people in China. There will be room for both Great Britain and Japan, and for all the world, if they do not get in each other's ways.

"Gentlemen, you have seen a crowd slowly struggling to get through a wide enough door, to a football match, or out of a concert-hall—and you know that if they would stop squeezing and pushing, and move in and out with swift precision of a regiment, they would all reach their aim without friction or annoyance, and in a fraction of the time.

"Live and let live should be an accepted rule of conduct among nations: we stand for it in all our foreign relations, commercial as well as political. We repudiate the idea of capturing markets by unnatural and unworthy proceedings. What we ask is a fair field and no favor. I know that this policy is precisely in accord with British traditions and with British traits of character. I therefore confidently look forward to the future of the two nations marching side by side in loyal co-operation on the road of peace and prosperity.

"In this sentiment, and with all best wishes for the success of your labors, I raise my glass to the health of the distinguished chairman and members of the British Economic Mission."



Baron K. Shidehara, Japan's Foreign Minister

The New Open Door Doctrine

Japan's Plea For Equal Opportunity

WITH an annual increase of 1,300,000 in the population of the Empire, Japan is facing the gravest problem that has ever disturbed the equilibrium of a modern state. Accepting the new trend of world opinion for the pacific adjustment of international questions; discarding war as an instrument of national policy and trusting in the good-faith of the other Great Powers to give practical effect to their solemn pledges, Japan stands at the cross roads and placing her problems before the world, asks in no uncertain tone: "What are you going to do about it?"

Japan has kept the faith. She has lived up honorably to all her international treaties and commitments. For the past twenty years, ever since her victory over Russia, she has time and again given way to outside pressure in order to retain the good-will and friendship of the other Powers. Japan subscribed to the Hay Doctrine of the Open Door and Equal Opportunity without reservations; the only Power that tied no strings to its acceptance. She went further and even offered to co-operate financially with American capital to give effect to that doctrine. In subscribing to the Open Door with its corollary principle recognizing the sovereignty of the Chinese Government over its far-flung territories, Japan unwittingly tied her own hands at the precise moment when the beneficiary of Hay's diplomacy was in secret alliance with Russia to encompass her ruin. Considered in the light of subsequent revelations, the Hay Doctrine was the most unfortunate blunder in the whole history of American relations with the Orient, placing Japan on her honor to respect the sovereignty and integrity of China at a time when the latter had handed over her territory to Russia under the terms of a secret military alliance designed for the humiliation and elimination of Japan as a factor in Asiatic affairs.

Japan fought the war with Russia and on its termination restored to China her sovereignty over a territory that by all recognized rules of warfare she had forfeited. America stood by and held the ringside while Japan staked her existence to uphold the doctrine that since 1900 has been the corner-stone of American policy in the Far East. From the moment the Portsmouth Peace Treaty was signed, the whole weight of American diplomacy and finance was exerted to deprive Japan of the hard won fruits of her sacrifices.

Croly's "Willard Straight" and Harriman's Biography, by George Kennan reveals the sordid intrigue by which Japan was to be forced to sell the South Manchuria Railway to Harriman or suffer the consequences by the construction of a parallel line that would destroy its usefulness. From 1905 to the outbreak of the Great War, after opening up Manchuria to outside commerce, creating a world-wide demand for the soya bean, bringing under cultivation enormous tracts of virgin farming and timber lands, developing the great Fushun coal mines, establishing industries, expanding the port of Dairen, and in many other ways adding to the wealth and prosperity of a region that from time immemorial had been overrun with bandits, Japan was hampered at every step by the petty jealousies of other nations whose merchants appealed to the principle of the Open Door in order to deprive her of the fair fruits of her victory. Japan borrowed \$100,000,000 in Great Britain to rebuild the South Manchuria Railway and purchased all the materials in the United States, creating a modern railway in Asia that stands as an object lesson of the efficiency of American equipment. Over a period of ten or more years, the S.M.R. and other Japanese enterprises in Manchuria, purchased materials and supplies from American manufacturers to the value of \$75,000,000, without asking for the loan of a dollar, creating a market for railway equipment that gave Americans their first real engineering foothold in China. During all these years of big purchases and the steady Americanization of the show-railway of Asia, Japan was attacked by American writers and chambers of commerce for violating the open door principle.

Since 1915, and the unfortunate presentation of the Twenty-One Demands with the ultimatum invited by Yuan Shih-kai to

save his face and throw the onus of the intrigue upon Count Okuma, Japan has surrendered step by step every advantage she had gained in China. She handed back Shantung; withdrew her armies from Manchuria and Siberia after squandering on the adventure over half her profits from the Great War; consented to the cancellation of her alliance with Great Britain, giving up the only effective safeguard against the comeback of Russia; accepted cheerfully the limitation upon her naval armaments and in many other ways evidenced in a practical manner her desire for peace and understanding with China and the Powers. As a result, Japan is witnessing the new advance of Russia in Asia, that takes up the program of Slav expansion where the Czarist régime left off. Japan now confronts the menace she so strenuously endeavored to protect herself against ten years ago during the consortium negotiations by retaining her right to construct the Taonan-Jehol railway, a right the other Powers denied to her in order to bolster up China.

The whole structure of Japan's strategic defences in Manchuria have been gradually undermined. The Manchurian authorities, operating on the foundation of a prosperity created by Japanese capital and enterprise, have violated their solemn agreements concerning the construction of new railways, crisscrossing and paralleling the lines that Japan holds as her outer line of national defence, stubbornly opposing the extension of the Kirin-Tunhwa line to the Korean border and creating a system of new lines designed to divert the traffic of the Three Eastern Provinces to outlets under their own jurisdiction. Japan has made no protest. As evidence of her friendly sentiments, peaceful intentions and desire to live in terms of neighborly accord with China, Japan has magnanimously declined to take advantage of her military strength to enforce her treaty rights. In addition, the Chinese refuse to accept the validity of the 1915 Treaty, and are constantly agitating for the return of the Laotung Lease and the reversion of the South Manchuria Railway, protesting even against the operation of the shale-oil plant at Fushun as a violation of the agreement which, they contend, confines the activities of the S.M.R. to mining coal.

In effect, the world is witnessing the operation of forces in Manchuria that must inevitably lead to the elimination of Japan's dominant influence in that region. If Japan ever did harbor the design to annex this territory, she has lost her opportunity. Japan's position is that the construction of these new Chinese railways and the creation of ports under Chinese jurisdiction are all to the good. The more railways, the more trade, the more outlets for her manufactured products and increased facilities for obtaining raw materials and food. In other words, despite the menace to her strategic and economic position in Manchuria brought about by all these activities, Japan adheres to her policy of "live and let live," recognizing the principle of equal opportunity for all, even though in so doing, her own vital strategic interests are impaired. In effect, Japan has practically surrendered her dominant position in Manchuria to satisfy the wishes and demands of others and demonstrate her friendship for China. Here we have a forceful exposition of the working of the new trend of world politics where strategic, diplomatic and all other national considerations are subordinated to the stern necessities of trade. In pursuit of this new policy, Japan has yielded so much ground in Manchuria as to endanger her very existence. The full measure of her sacrifices will never be understood by China or the rest of the world until the Slav advance through Mongolia once more menaces the *status quo*.

Turning to other phases of the Japanese problem, we see a world that on all sides of the Pacific has closed its doors to the children of Nippon. Of all the great peoples of the world, the Japanese have no suitable colonies or outlying possessions to absorb her overflow. They must remain at home and eke out a precarious existence on their overcrowded farming lands or join the vast army of industrial workers. The Japanese do not question the right of other countries to regulate their immigration and exclude undesirables. They apply for their own protection the same restrictions in their own country. They do, however, keenly resent being

discriminated against. They cannot understand why the American people who treat them as equals in all other matters, should single them out for discriminatory legislation in the matter of race. They recall that during the Paris Peace Conference when the question of racial equality was on the tapis and the majority of the delegates were in favor of the Japanese proposal, President Wilson after accepting majority rule as decisive when the Monroe Doctrine came up for incorporation in the League Covenant, reversed himself and declared that unanimity was required on the racial issue. The Japanese people cannot understand why a great nation whose merchants and manufacturers are keenly endeavoring to expand their trade with the Orient, should insult the people whose friendship and goodwill is essential to their success. It is difficult for the Japanese man-in-the-street to understand why the State of California whose future greatness and prosperity depends largely upon the growth of its trade with the Orient should permit its demagogues and labor agitators to intimidate state and federal legislatures in passing laws that are equivalent to kicking their best customers in the face.

The Japanese are frequently reminded by Americans that their interests and those of the United States are identical and they should co-operate to carry out each other's interests in the development of the Pacific regions. The Japanese answer, that this co-operation and understanding has been the main objective of their diplomacy ever since Viscount Aoki accepted without reservations the Hay Doctrine. The Japanese have at all times given practical effect to this guiding principle in their relations with America. They point to the South Manchuria, to the Korean and Shantung Railways and to their industrial establishments in China, all equipped with high-class American machinery. In Japan itself, they have practically Americanized their industries, their municipalities, their transportation, their architecture, their banking, and in many ways, even their customs. They have co-operated with American capital in the establishment and development of many of their leading industries. They have gone to America for their loans until to-day there are over \$600,000,000 of Japanese bonds and shares held by American investors. They invite attention further to the fact that their co-operation in using American raw and half-finished materials in the manufacture of their finished products for the Chinese markets, in addition to their direct purchases of American goods for consumption in China, is approximately equivalent to \$100,000,000, or twice as much as all the American exports to China through their own firms.

For six years they have patiently waited for Congress of its own volition to revise the immigration laws and place them on a plane of equality with other nations. The Japanese people have their pride and will not force themselves into countries where they are not welcome. They have learned from sad experience that no matter where they emigrate and by dint of hard work, thrift and sobriety, reach a state of prosperity, their success draws upon them the envy and hostility of the native workers. Sooner or later, a campaign is started to deprive them of their holdings and exclude them as "undesirables."

The Japanese developed vast tracts of California's farm and fruit lands. They became prosperous and incurred the enmity of the American labor unions. The alien land laws of California deprived them of the right to own or lease lands in that state. Federal legislation excluding them from further entrance into the country completely eliminated the "Japanese menace." Deprived of the right to own and lease land in California, the Japanese turned to the sea, and in a few years practically monopolized the fishing of Southern California, making Los Angeles the premier fishing port of the United States (taking this honor away from Boston) and creating a new outlet for the export of American food products to the Orient. The labor unions of California started another campaign to deprive the Japanese of the right to engage in this industry and only the vigorous opposition of the Los Angeles Chamber of Commerce prevented the enactment of further discriminatory legislation, that incidentally would have killed one of the most profitable and promising industries of the state. The Japanese were excluded to protect American labor and American institutions. Their place in the economic life of the state was filled first by Filipinos and then by an invasion of Mexican peons, whose standards of living, morals and other characteristics, are far below the most backward of Asiatic peoples. California created a precedent and now every other country in the world follows the same methods in closing their doors to the Japanese.

The Japanese have gone into Brazil and developed vast tracts of unhealthy swamp and bottom lands in the upper Amazon valley and after years of patient toil and hardships in a sickly tropical climate, when they were nearing prosperity, the Brazilian peon is clamoring for legislation to exclude further Japanese immigration; an agitation that will not cease until the holdings of the Japanese are transferred by legalized methods of highway robbery to Brazilian politicians.

Nearer at home, the Japanese have gone into the Davao district of Mindanao and after two decades of heartbreaking toil, privation and danger, have developed this savage corner of the Philippines into the most productive and prosperous hemp district of the archipelago. It is estimated that the Japanese population of Davao is between ten to fifteen thousand and in the twenty odd years since they settled in the district, nearly one thousand have been massacred by the fanatical Bogobo Moros. Yet, the Japanese Government has made no protest against these atrocities. The story of these killings is shrouded in deep secrecy. Neither the American, Filipino or Japanese Governments are willing to invite publicity to a situation that in China or any other unsettled country would have been followed by a stern demand for indemnities and guarantees for the protection of Japanese lives and properties. The Japanese do not own the lands they have developed in Davao, holding them in the main, on fifteen year leases. After all these years, the Filipinos now claim that they are being crowded out and as they cannot exclude the Japanese, are agitating for the enactment of an alien land law which will prevent the Japanese from ever gaining ownership of the lands they now lease. The Japanese went into Davao when the region was an insecure hostile Moro wilderness. Now that they are prosperous and the danger of a Moro uprising is eliminated by their disarmament, the Japanese have become a "menace." Under the protection of the great and good United States, the Filipinos are clamoring for the passage of legislation that they would never have the courage to enact as an independent state.

Japan produces no cotton. When she started her industrial career, her merchants went into India seeking a steady supply of raw material and in the course of years increased their purchases until in 1926 they were taking over half the exports of India's raw cotton. By close co-operation in all branches of purchasing, transporting, financing and manufacturing the raw material and repeating the process in marketing, Japan was enabled to carry the finished product back to India and undersell in certain grades the Indian mills in their own territory. With no thought of the immense purchases of raw cotton which contributed so largely to the development of the Punjab and the prosperity of the farmers, the Mill Owners in Bombay started an agitation against Japan based on the charge of unfair competition and year after year demanded from the Indian Government the imposition of discriminatory tariffs to protect themselves against a competition their inefficiency, graft, inhuman treatment of labor and slipshod methods in manufacturing and selling could not prevail against. Japan's scientific methods availed her nothing in the fight. Duties were imposed which practically ruins a trade laboriously built up on the basis of clean cut, honorable reciprocity, and in which the real gainers were the Indian farmers. Japan's lack of sufficient iron deposits made her a convenient dumping ground for India's highly subsidized pig iron and iron ore surplus, thereby contributing to the profitable operation of the Indian Steel Mills at Jamshedpur, the central feature of the whole scheme of British Imperial defence east of Suez, including the Singapore Naval Base. Japan's iron requirements relieved the British and Indian treasuries of extra subsidies to ensure the successful maintenance of this key to their strategic security. As long as Japan buys these raw materials she remains a welcome friend, but let her try and sell the finished products from these raw materials in India and she becomes a "menace," an enemy and despoiler of the Indian people. Unable to co-ordinate their activities, the Indian and allied British textile interests have sought protection against the superior organizing skill of the Japanese by a series of discriminatory tariff regulations designed to exclude the products of the Japanese mills. There is no spirit of reciprocity in India.

During the Great War, Egypt which raises no tobacco, could not procure her regular supply of Turkish and American leaf to keep her cigarette factories in operation. She found in China and Japan a mild leaf that blended in well with other Near-Eastern tobacco and was enabled to carry on and hold her immensely profitable trade. Nearly fifty per cent of all tobacco entering Egypt

from 1916 to 1926 was Far Eastern leaf (Chinese and Japanese) and the trade was in the hands of two Japanese firms. The Greeks could not compete with the Oriental prices and by bribery finally influenced the Egyptian Government to impose a prohibitive tariff against the Far Eastern tobacco. Without warning, the new duties were promulgated and went into immediate effect. Japan's trade was wiped out and the cargoes in the bonded warehouses and those *en route* to Egypt had to be resold at an enormous loss in other markets. A Greco-Egyptian love feast took place in Cairo in which prominent Egyptian officials were decorated with the highest Greek honors. It was a great victory. The Japanese, saved the Egyptian industry during and after the war, but they became a "menace" immediately their services were no longer required. We do not recall that the Japanese Government even filed a protest, pocketing the comparatively small loss in the hope of building up a more lucrative trade in Japanese piece goods.

We might point to Japan's experiences in China, where her investments and trade have made her vulnerable to Chinese methods of retaliating against a country with whom they have a diplomatic dispute. The Chinese apparently lie awake nights devising new schemes to mulct the Japanese and destroy the value of their investments in this country. On many occasions, the Chinese have been incited by their own government officials to wage war upon Japan. Anti-Japanese boycott associations without legal standing have maintained their own courts and jails, levied fines and punished offenders against their regulations. Cargoes have been confiscated and burnt, shipping has been held up and interfered with, in order to bring economic ruin upon Japan. The Chinese textile industry, unable to compete with the more efficient and skilfully managed Japanese mills, are clamoring for protection in the form of discriminatory taxation and other handicaps that will eliminate the Japanese "menace" and hand the home market over to themselves. To such an extent has this campaign of discriminatory taxation been carried, that Japan's investments in cotton mills in China are now seriously imperilled. On the Shantung Railway (Kiao-Tsi Line), although the freight rate on cotton yarn between Tsingtao and Tsinan remains the same for the products of Chinese and Foreign owned mills, the latter must pay in addition to the freight (\$8.09) a Contribution Tax of \$6.47 per ton and a Goods Tax of \$13.00 per ton, a total per ton of \$27.56 or \$5.51 per bale, while the products of the Chinese owned mills are exempted from the goods and contribution tax, giving them an advantage of \$19.47 per ton or \$3.89 per bale. In the finished piece goods, the Japanese owned mills pay \$12.83 per ton freight, \$10.26 Contribution Tax and \$17.32 Goods Tax, a total of \$40.41 per ton or \$9.33 per bale. The Chinese product is exempted from both goods and contribution tax and enjoys a reduction in freight, which is \$7.55 per ton, or \$1.74 per bale, a difference in favor of the product of Chinese owned mills of \$32.86 per ton, \$7.59 per bale or .9 cents per piece. More or less the same discrimination in favor of the products of the Chinese owned mills in Shanghai, is seen in the shipments of yarn and piece goods over the Chinese Government railways operating out of Shanghai.

Here we have a concrete example of what Japan is up against in China. Japanese capital has erected cotton mills in this country and given employment to hundreds of thousands of workmen. By co-operation, co-ordination of effort, economy, efficiency, scientific management and superior technical skill, these Japanese mills have been able to compete throughout all the disastrous boycotts and interference with their operation through labor troubles, and still make a profit. The Chinese owned mills unable to compete with these methods, have demanded and received protection against the Japanese "menace." Unless these discriminatory taxes are repealed, the Japanese owned mills in China will become a complete loss.

Japan's investments in Manchuria (outside of the S.M.R.), have never paid a fair dividend. Japan has poured her millions into co-operative Sino-Japanese enterprises and the money has gone into the pockets of Chinese officials who have waxed rich and prosperous preying upon their partners. Japan's investments in Tsingtao and Shantung are constantly endangered by uncontrolled labor unions and Nationalist agitators.

Japan has advanced nearly fifty million yen to the Hanyehping Iron and Steel Works in exchange for the delivery of a stipulated tonnage of iron ore from the Tayeh Mines. In the original loan contract, Japan agreed to pay three dollars silver per ton of ore, at the mines. Expert Chinese authorities have since admitted that the cost of this ore was only one dollar Mexican per ton delivered

aboard the steamer at Tayeh, a profit to the Chinese of two dollars per ton. Yet the world has since rung with the denunciations of Japan's attempt to monopolize China's iron resources by unfair methods. The Hanyehping Steel Works are in such a condition that before they can be brought once more to a profitable working condition, they will probably have to be rebuilt. And so it goes. As soon as China's full sovereignty is restored, discriminatory tariffs, excessive taxation together with illegal handicaps will be devised to ruin Japan's investments in the country. But why go on.

The picture disclosed by a study of Japan's foreign trade relations is not a bright or inspiring one. We see a nation whose people, condemned to stay at home, are building up by dint of stringent economy, patient toil, intense co-operation and intelligent co-ordination in every line of activity, a profitable textile industry whose very existence depends upon free access to sources of raw materials and markets for the sale of the finished product. We see the cotton and rayon textiles of Japan finding their way into the far-away countries of South America, Africa, the near East, Persia and Southeastern Europe, markets for low grade goods which the British mills have passed by in their concentration upon the higher grades and finer counts. The Japanese take the short staple Indian cotton, mix it with the still shorter and coarser Chinese product and turn out a line of cheap piece goods eminently suited for these low purchasing markets that other manufacturers cannot touch without employing the same low grades of cotton mixing and fabrication. We see a nation without natural resources scouring the world for raw materials, transporting them to the homeland and by the labor of its people, converting them into finished products and again searching the world for markets in which to exchange the products of their toil into money with which to buy the necessities of life. We see the miracle of England being repeated on this side of the world by a nation that has no colonies, no outlets, no sources of raw materials or markets within the Empire to provide a foundation for its prosperity. We see an industrial state rising rapidly into world prominence by the sheer necessities of a people whose only asset is their ability and willingness to work. Close the sources of raw material to these people or erect tariff walls that exclude the product of their toil, and they starve.

Japan's future in the world hinges on a reciprocal exchange of products, a more liberal and humanitarian attitude on the part of other Powers to her necessities. "*Live and let live*," is Japan's motto. Japan is practicing it in her international relations. As Baron Shidehara so forcibly points out, it is the cardinal feature in all Japan's foreign relations, commercial as well as political. There is room enough in the world of to-day for its increasing population. If some nations elect to close their doors to the people of Japan, at least give them the opportunity of existing peacefully by honorable competition in reciprocal trade.

Japan stands at the end of a road and places her problem before the world. Confident in her ability to survive in the keen struggle for existence, Japan asks for a *fair field and no favor*. The future peace of the world will depend upon how far the other nations are willing to practice what they preach.—G. B. R.

Expansion Program for Fushun Oil Shale Plant

REFERRING to the new Fushun Oil Plant, the *Manchuria Daily News* says that the satisfactory working of the plant has been a wonder and testifies to the thoroughness every point was covered in manufacture, transportation, storage, sale and delivery, not to mention the treatment of its various by-products. A substantial appropriation of Yen 13,000,000 for the second stage expansion has been adopted by the Fushun Collieries management, to extend over the fiscal years 1931-32, independently of the Collieries' enterprise estimate for the new fiscal year, 1931.

The interest of the Fushun Collieries management in this new venture has been intensified by the flawless success and actual results. Incidentally, the principal and auxiliary by-products have promised better returns than at first counted upon. Not to mention the stability of the market for the outputs, experiments have satisfied the management of the possibility of still lowering the producing costs. Moreover, as the Open Cut Mining at Kuchengtzu is extended, the amount of Oil Shale available has increased and, for its treatment, further enlargement of the existing Plant has been rendered necessary.

A Grim Farce

ON with the show! During the intermission and scene-shifting in the continuous performance of the mammoth three-ring Chinese military circus, while the war-lords and armies are changing uniforms and preparing for their next appearance, Dr. C. T. Wang dances blithely forth into the limelight chortling his opening lines in the serio-comic interlude, entitled "The Abolitionists." Sitting out in front, it is like watching an old-fashioned minstrel show. Dr. Wang in the center, supported on either side by Dr. Sze and Dr. Wu, heading a troupe of talented All Nationalist Stars and a Yes! Yes! chorus of newspaper yodelers led by a Doctor from Missouri, sit in a row along the front of the stage bandying conundrums and snappy conversation with a "Kunnel" Stimson, a "Parson" Henderson and very quiet Nipponese gentleman standing in the right wing.

The Nationalist troupe warble the latest popular song, entitled "Keep your Dirty Hands off China," "We want Shanghai," "Here's your Hat, What's Your Hurry," and other hits that bring explosive applause from the Chinese gallery and groans from the rest of the house. In the background, flitting across the stage from left to right and right to left, from back to front and back again, are a group of peripatetic supernumeraries whose habitat off the stage is on some rickety old railway train or smelly little steamship travelling back and forth between Peking, Shanghai and Nanking, with no fixed abode or place to hang up their hat. These understudies to Stimson, Henderson and the very quiet Nipponese gentleman, occasionally break into the patter, but are promptly squashed by Dr. Wang, who crabs their part and tips the cue to Wu or Sze to grab the spotlight.

The popular and versatile Wang monopolizes the conversation and maintains a steady flow of wise-cracks and persiflage with the two end-men. Sometimes, very rarely, Wang gets out of breath or has to stop to think up a quick rejoinder to some monosyllabic side remark from "Bones" Stimson or "Bones" Henderson. This momentary silence on the part of Wang provides the two foils for his wit with an opportunity to get in a word edgeways or spring another conundrum so filled with droll bon-mots that even the nimble-witted Wang fails to catch the point. Stimson and Henderson break into the Celestial symphony and whistle softly a little refrain that sounds something like one of the pre-war Leicester Square ditties: "We are moving along, in our own sweet way!" Whereupon, the P.H.D. from Missouri who suffers from a chronic anti-British complex, makes an angry grimace at the whistlers and sings a solo, "Get out while the going is good or you'll get knocked down and thrown out!" This brings down the Chinese side of the house; a regular wow. Stimson, Henderson and their two ambulatory understudies are at times flabbergasted by the Celestial brand of repartee and have to take a long, deep breath before riposting to Dr. Wang's wise-cracks. The Gentleman from Japan, with his traditional poker face, declines to join in the banter of words which fail to register on his part of the audience. Dr. Wang may amuse the American and British end-men and get enough small conversational change out of them to keep the farce moving hilariously along, but all his merry sallies fail to make any impression upon the Nipponese, who many centuries ago learned all the quips and quirks in the Chinese Joke Book and has never been known to appreciate their subtle humor or crack a smile. Like Bret Harte, the Nipponese know from experience, that beneath a "smile that is childlike and bland" lurks a peculiar habit of keeping a whole stack of aces concealed somewhere up the Celestial gentleman's sleeve.

The theme-song scraped by a one-string Chinese orchestra is taken up by the Nationalist chorus who shout lustily, "We Want What We Want When We Want It, and We Want it Right Now!" Stimson, Henderson and their understudies croon a soothing refrain, the bruden of which is; "Don't Cry, Don't Sigh, You'll Get What you Want, Bye and Bye!" Out in front, the foreign portion of the audience punctuates the chant with a monotonous, rythmatic, repetition of the single word "Gradually! Gradually!" The word fails to register with the Nationalist troupe and their part of the audience. Apparently it has no equivalent in jocular Chinese. The Celestial audience hisses, cat-calls, stamps and yells

its disapproval; "Shut Up! Shut Up! You're Spoiling Our Show!" In wrathful indignation at this nonsensical refrain, which cramps his style and keeps the limelight wobbling from dead center, Dr. Wang yells at the audience "Waddayermean, Gradually! The P.H.D. from Missouri rushes up and hands him a page from the advertising section of *The Ladies Home Journal* with the picture of a flour sack from Minneapolis on it, which gives Dr. Wang his cue. His face lights up and he yells back: "If Eventually, Why Not Now!"

So the farce out front goes merrily on, with Dr. Wang holding the limelight and doing most of the talking. Behind the scenes, stalks Grim Tragedy. The boom of guns, the explosion of shells, the whirr of bombing planes, the tramp of armies, the shrieks of victims and the moans of despairing humanity at times silences the performance. A piercing appeal for Mercy followed by the swish of an executioner's sword is audible above the play and two female heads are flung out upon the stage. Cries of horror from the foreign audience! A Bandit Chief swaggers out of the wings for a second and shouts: "What's all this fuss over two foreign women. It is only an old Chinese custom. We have the power to take all you foreigners, to hold you for ransom and to kill you." A long line of missionary captives, men and women, stumble across the rear of the stage, each placarded with their ransom value, goaded forward by bayonet pricks and jeered at by their executioners. They stretch out their arms, appealing to the audience for succour; but it is all part of the great show. The long line of Christian captives herded along to their martyrdom, disappear in the distance, abandoned to their fate. Not an effort is made to save them.

* * * *

The noise of battle subsides and Dr. Wang steps quickly to the front and assuming a pose of contemptuous indifference to his interlocutors, addresses the audience.

"Don't pay any attention to back-stage; the real show is out here in front. We have just finished another playfully contested election in which only three hundred thousand voters were killed or injured. It cost us a few hundreds of millions of dollars to carry the day, but our side is again firmly seated in the saddle, running the show. We have five hundred million more people. We have tons of money and the few hundred millions expended in elections are a mere bagatelle to our versatile Financial Wizard, who will conjure up all the money we need to carry on with. But, after all, these things are just side shows. Keep your eyes fixed on the main attraction. The show will now proceed. Turning to his Chinese audience, he says to it in English:

"Never will China regain her full sovereignty and her proper place in the family of nations unless extraterritoriality is abolished. Internal political disputes, sometimes affected the progress of negotiations for the abolition of extraterritoriality. With the successful suppression of the Northern rebellion and the unification of the country once more achieved, great progress would now be made in China's diplomatic negotiations with the Powers.

"Dr. C. C. Wu, the Chinese Minister at Washington was to have returned to China to attend the 4th plenary session of the Central Executive Committee, but in order to take full advantage of an excellent psychological moment to proceed with the extraterritorial negotiations with the United States Government, Dr. Wu has decided to remain in Washington.

"Although the success or failure of the extraterritorial negotiations depended very much on the internal political situation, public support in China was the most important factor. Shantung had been returned to China chiefly owing to the vigorous protests of the people, while the restoration to China of complete tariff autonomy was also the result of public agitation. The people of China, should unite and fight for the abolition of extraterritoriality."

"Some powers, have expressed their friendship towards China, but we want sympathy expressed by action, not words. The National Government specially hopes that Great Britain, the United States and France will soon be able to give concrete evidence of their friendship in the extraterritorial negotiations."

Dr. Wang is not fortunate in citing the return of Shantung as justification for another outburst of Chinese patriotic fervor. He forgets that this diplomatic victory was due to the intervention of the American Government which brought friendly pressure to bear upon Japan at the Washington Conference to negotiate the

agreement that led to the withdrawal of the Japanese troops and the restoration to China of its sovereignty over the "Holy Land of China." At that time, Dr. Wang had the sympathy of the whole world in his anti-Japanese performance; to-day he has all the world against him. Shantung was returned to China a prosperous, happy, contented province, after several years of Japanese rule. Now look at it! Shantung lies prostrate, ruined, depopulated, overrun with bandit armies, its ports held by independent military chiefs. Millions of its lovable, good-natured, hard-working, peaceful people have died from starvation. Other millions have trekked the long road to Manchuria to escape the death its taskmasters decreed upon them. Shantung fell to the rule of the most degraded, despicable militarist that has risen from the coolie ranks to despotic power in China; a Seven-Tailed-Bashaw, who bought a harem of twenty odd international beauties and starved the people to wring from them the taxes to pay for his pleasures and vices.

What happened to Shantung has happened to nearly every other province in China. Five million people were starved to death in Shensi in order that the armies of its war-lord might live. Everywhere we turn in China the same sad picture meets the eye. Desolation, privation, hunger, misery, grinding taxation, despair and death have been the portion of the people. The wealth of the country is now concentrated in Shanghai. Only the presence of a few war-ships and a small force of foreign defenders stand between Shanghai and its spoliation. Withdraw this protection and the Nationalist army would march down Bubbling Well Road the next day and take possession.

Dr. Wang's appeal, published in all the vernacular newspapers of the country will encourage the people to further anti-foreign agitation, trade boycotts and secret warfare against friendly nations which Nanking will interpret as a "spontaneous outburst of patriotic indignation against foreign imperialism."

It may be that national honor, dignity, respect for the flag, and other fundamentals that have heretofore guided the foreign policies of the Great Powers are now subordinated to their economic necessities; America, Great Britain, Japan and France may refuse to take any additional measures for the protection of their nationals and interests in China, but it would be most unwise and unstatesmanlike on the part of Dr. Wang to presume too much on this flinching from duty by infuriating the masses and lashing them into further excesses against foreigners. Although these Powers, may sacrifice their national dignity and even honor to placate the Chinese, we do not believe that at this stage of world unemployment and distress that they will tolerate another interference with trade, such as characterized China's recent anti-British and anti-Japanese boycotts.

From the viewpoint of her diplomats, China's issues with foreign countries are the most important problems confronting the nation, but there are still greater and weightier internal issues that must be solved before foreigners can safely surrender their extraterritorial privileges. Chiang Kai-shek, the head of the National Government and Generalissimo of its armies, tells us that it is still unwise to entrust the lives and properties of foreigners to self-seeking officials whose corruption and inefficiency have, more than anything else, aroused the people of China to rebel against the Nationalist régime. As an offset to Dr. Wang's declaration, read the scathing indictment brought against the Nationalist authorities by their own leader:—

"I have noticed recently," General Chiang stated, "the unpopularity of the Kuomintang in various parts of the country. The behavior of certain members of the Party have left in the minds of the public the impression that the Kuomintang has become a privileged class. This is highly regrettable. Any privileged class is doomed to fail. Few members of the Party are really fighting for the welfare and benefit of the public. Most of them are only struggling for their own selfish interests and all they want is power."

"In 1911 we rebelled against the Manchu Government for the reason that the Manchus had created for themselves a privileged group. It is alarming to come to the realization that we ourselves are being regarded as members of a privileged group. If such a condition continues, the Kuomintang Government will fail and we shall be unfaithful to our leader, Dr. Sun Yat-sen."

"From now on all members of the Party, including those who occupy high executive posts, must be strict with themselves. If any Kuomintang members should prove to be corrupt and inefficient, they will be severely punished, much more so than if they are non-members. This is a Kuomintang Government. If we cannot maintain good discipline in the Party, we have no hope of establishing an efficient Government."

"The spreading of Communist influences in various parts of the country," concluded General Chiang, "is another proof that our members

are not carrying out their duties faithfully. It is only the regrettable behavior of our members that is driving people to join the Communist ranks."

These utterances from two of China's foremost spokesmen coming within two weeks of each other, is evidence of an absence of governmental co-ordination at Nanking. If Chiang is right, Wang is wrong. If Wang is right, Chiang's speeches should be censured or edited. If Chiang is called upon to put down revolutions, suppress bandits, wipe out communists and impose law and order to pave the way for the full restoration of China's sovereign rights, then Wang's appeal to the masses only tends to undo all that Chiang may accomplish. Chiang, the soldier, knows that the most formidable obstacle to the stabilization of government and the consolidation of Nanking's power, is the rapidly growing communist menace. Wang, the diplomat, should know that any further anti-imperialist or anti-foreign activities will be turned against Nanking by those who are directing the Communist movement.

Dr. Wang should know that even the most hard-boiled, die-hard imperialists are his friends and admirers. They are all with him in principle, deeply sympathetic with China's aspirations and looking forward with great hopes to the ability of his government to stabilize conditions throughout the country as the first step towards the surrender of their privileges. The difference between Dr. Wang and his critics is merely one of procedure, Dr. Wang, Chinese-like, prefers to do things backward, placing the cart before the horse by demanding the abolition of extraterritoriality before his government has established its rule over the country. His foreign friends, who have watched the gradual impoverishment and ruin of the country, the decimation of its people by famine, plague, war, bandits and communism, are naturally loath to surrender their only insurance against the same fate until the military end of Dr. Wang's government shows some proofs of its ability and willingness to protect them.

Friendship must be reciprocal. In their desire to demonstrate friendship to the Nationalist Government, the foreign Powers have already provided many proofs of sincerity; proofs which have given Dr. Wang plenty of "face" with his people and enabled him to retain his portfolio. Dr. Wang and his Government has repeatedly expressed their intention to suppress banditry, illegal taxation, confiscation of property and other impediments to the full recognition of China's sovereign rights, but as yet they have failed to make good. Foreigners also expect from Nanking, performance and not promises.

A day may arrive, when the great Christian Powers will grow tired of seeing defenceless missionaries tortured and martyred. Some day, if the cleaning up process is not accelerated, some Christian Power may rise up in its wrath and proclaim: "THE KILLING OF MISSIONARIES MUST CEASE!" That it has not been done before now, is concrete evidence of the forbearance, toleration, friendship, and sympathy these Powers have extended to China in her hour of agony; a policy that has maintained Dr. Wang in office and strengthened his hands.

A new Government is in the process of making in Nanking. It faces a tremendous task to establish its authority and suppress the bandits and communist hordes who rule whole provinces. In this campaign Nanking has the full sympathy and support of the foreign community and their respective governments. Until that herculean task is completed and the interior once more a safe place to live and do business in, foreigners in China are in no mood to applaud the otherwise meritorious performances of Dr. Wang and his group of Abolitionist entertainers. *Grim tragedy lurks in the background.*

The Four Horses of the Apocalypse are still abroad in China, Plague, War, Hunger and Death have ridden roughshod over the terror-stricken millions of Cathay. Behind them drives the Beast in all its hideousness. Millions upon millions of poor humanity, men and women, young and old, have fallen to the ground stunned with terror, to be crushed by the relentless iron tread of the steeds of the four feudal horsemen of the Beast. China lies helpless, powerless to defend herself against this invasion. She needs help from the outside to fight the scourge of Humanity. This is no time to talk of surrendering the only defence against the Horror. To even discuss the matter is a betrayal of Humanity as a whole, an invitation to the Four Horsemen to break through the flimsy barriers of China and once more spread plague, desolation, war, famine and death throughout the world.—G. B. R.

The Biter Bit

Some Reflections on the Proposed Silver Loan to China and the Penalties Attached to Boycotts and Trade Warfare

IF, as Marshal Chiang Kai-shek believes, China has fought her last civil war and national unity is now in sight, the time is not far distant when real reconstruction can be commenced. The mere fact that peace has been restored and that the defaulted interest payments on several of China's loans have been met, has already had a most encouraging effect on China's credit abroad. The prospect of permanent peace and revival of trade in China, is one of the bright spots in the present world depression, providing the opportunity for launching several schemes for her financial rehabilitation. Foremost amongst these is the proposal of the Silver Investigating Committee of the U.S. Senate to lend China 500,000,000 ounces of silver through the medium of an international pool. The plan outlined by Senator Pittman follows the same general lines of the scheme proposed to President Coolidge in 1927, and which for a time was seriously considered. The plan was to send a Commission of American Business Men to China to talk with the warring leaders and induce them to stop fighting and unite under some form of central government that could be financed with a loan large enough to provide immediate employment for the disbanded soldiers. As any such financial transaction would have to come under the Consortium Agreement and bring Great Britain, France and Japan into the mission, the scheme was dropped.

In other words, it is realized in the United States that any plan for the relief of China which involves a loan must be international in character. Many otherwise meritorious American schemes have had to be abandoned because of the reluctance of American bankers to assume the sole burden of financing China, and the opposition of the Chinese to any proposition that might imply even indirectly a recognition on their part of the Consortium Agreement or their inability to solve their problems without outside assistance.

The League of Nations, the logical international instrument for helping China get on her feet will not initiate any plan without the assurance beforehand of American support and the League officials are not enthusiastic about accepting a task whose success hinges upon the co-operation of a non-member state, especially when the government of that state has created its own instrument for financing China. As long as China is without a strong central government and her finances and currency remain in a chaotic state, American bankers will decline to shoulder the sole responsibility of any large loan for rehabilitation or other purposes. Any scheme for helping China that involves American co-operation will have to be international in character.

So we find then even in the proposed silver loan sponsored by Senator Pittman to relieve the silver producers of the United States, the international principle has been recognized by advocating the formation of a pool including Great Britain, France, Japan, Mexico and Canada.

Whatever criticism may be directed against Senator Pittman's plan, it must be admitted that he has very accurately gauged the fundamentals of the present situation in China, which he summarizes as follows:

- (1) The National Government of Nanking is the best that could be established, as far as trading purposes are concerned;
- (2) The warring factions in China are fighting only the administration and not the plans of the Government.
- (3) China is unable to develop herself unless she receives outside financial aid;
- (4) If the warlords enter the proposed coalition Government, the fighting will cease.
- (5) The soldiers are fighting at present as the easiest way to obtain food.

The Nevada Senator and his colleagues attribute the silver slump to the efforts of Great Britain to establish the pound sterling in India by dumping onto the world market at any price silver that has been hoarded for years in the interior of India. This dumping, he says, approximates 57,000,000 ounces annually but there remains in India between five to seven billion ounces which will ultimately be unloaded on the world market. This continued

dumping has caused the abnormal fall in the value of silver and China has been the greatest sufferer.

In this connection, it is interesting to recall that the Nationalist movement received its first impetus in 1925 through the South China boycott against Hongkong and British goods, causing immense losses to British trade and prestige. The Kuomintang leaders in Canton cheerfully paid out several millions of dollars to clothe, feed and house the boycotters and strikers during the year or more that the movement was in full force. Since then, in alliance with the Soviet, it concentrated its activities towards ruining British trade in this country.

If we were given to moralizing, it would be easy to point out that the so-called "capitalistic nations" have ways of retaliating other than by military force and if Great Britain had deliberately set out to even up the score with China, she could not have found a more efficient way to revenge herself than by manipulating the silver exchange to the disadvantage of this country. The Kuomintang, or the Nationalist Government, nearly wrecked Hongkong and British trade with China. A few years later, Great Britain through India, cuts the wealth of China in half and reduces it to a state of bankruptcy. The moral is, that boycotts and trade wars work both ways. China scored her victory over Britain and is now paying the penalty. When the British Government protested time and again against the unwarranted interference with its trade, it was politely informed by the Chinese authorities that they could not control the patriotic protests of its people against her imperialistic policies, etc. Yet the day arrived when the Chinese Minister to the Court of St. James had to be instructed by Nanking to make representations to the British Government in the matter of Indian silver sales and their adverse effect upon the currency and commerce of China. In the first flush of its enthusiasm, when it had Great Britain "on the run," the Kuomintang never thought that the tables might be turned and China brought to the verge of ruin and forced to appeal to the friendly offices of "Imperialistic Britain" for relief. Naturally, the British Government cannot dictate to the hundreds of millions of its Indian subjects what they shall do with their hoarded wealth of gold and silver and if the value of the latter is now reduced through the stabilization of the rupee, the rest of the world must expect these people to keep dumping their silver hoardings on the market. If, as Senator Pittman points out, this hoarded wealth approximates five to seven billion ounces of silver, and the people of India keep on unloading, any silver loan to China to stabilize the exchange, would be only a temporary expedient, calling for another billion ounces within the next year to again stabilize exchange and so on, until India's, hoardings of the metal are replaced with gold.

In the face of such conditions, no American group would be foolish enough to attempt the impossible without the full co-operation of Great Britain and other nations having important commercial relations with China. It would seem that in the present situation, Great Britain holds the trump cards, but cannot prohibit her Indian subjects disposing of their hoardings as they see fit. The Kuomintang is getting a dose of its own medicine administered in exactly the same manner as it forced the bitter dose a few years ago upon Great Britain. The biter has been bit.—G.B.R.

Edgar Allen Ore Crusher Catalog

The second edition of the Edgar Allen Stag Ore Crusher and Stonebreaker pamphlet has been considerably enlarged, remodelled, and brought up-to-date. Most of the illustrations are new, and the text deals with ore crushers and stonebreakers, both stationary and portable, portable crushing and screening plants, steel plate frame crushers, portable and stationary granulators, and methods of feeding. The essential data is given without elaboration, and the part is illustrated as far as possible by diagrams and photographs.

American Policy and Action in Relations with China

By STANLEY K. HORNBECK*

THE fundamental features of American policy in relations with China are, I believe, well known, so well known that I need only to mention them to have them understood. The American people and the American Government, in one Administration after another have believed in and adhered to what is known as the "open door" policy. The open door doctrine, in its application by the American Government to relations with China involves two principles, (1) that of equality of treatment as among foreign nationals and foreign interests in China, and (2) that of respecting the political integrity of the Chinese state.

The American Government has looked with favor on the development of the Nationalist Movement in China. It is sympathetic toward the aspirations of the Chinese people for an independent, healthy and strong national political existence. At the same time it wishes to refrain from interference in China's internal political conflicts, and it has refrained from taking sides as between or among contending Chinese political groups or factions.

The United States has maintained and does maintain in China American armed forces, under the authorization of express provisions of treaties and in order that there may be carried out the duty of this Government to accord protection to American lives and, incident thereto, to American property, in situations where local agencies are no longer able to afford such protection as is due.

For more than a century most of the more important of the commercial powers have maintained naval forces in Chinese waters. As of May 31, 1930, there were in Chinese waters foreign naval vessels including all types, as follows: British, 53; American, 40; Japanese, 14; French, 10; Italian, 3; Portuguese, 1. This is a much smaller number than in 1927.

In pursuance of its policy of protection, the American Government is solicitous first of all for security of life. When the situation in particular areas in China becomes such that American lives are considered to be endangered the American Government has pursued the policy of *advising* American citizens to withdraw from places where they cannot be protected or from which they cannot readily be evacuated. The Government has no authority to *order* American citizens to withdraw from such places. All it can do is to *advise*. For the most part American citizens resident in China have followed the advice given them. However, in some instances they have elected to remain at their places of residence.

Among the Americans resident in China, some individuals and groups have taken the position that they do not wish that their Government afford them any protection. With regard to this matter the Government's position is, in general, that the action of a citizen in waiving his right to diplomatic intervention and other forms of protection cannot divest his Government of its right or obligation to take such action as may be required of it under provisions of law (including treaties) or such action as it may deem expedient subject to the restriction of such provisions. An American

citizen in China, so long as he remains such, cannot waive the application to himself or his property, on the basis of existing treaty provisions, of American laws. The American Government has obligations as well as responsibilities, in respect both to China and to American citizens, and of general as well as particular application.

In connection with the presence of foreign armed forces in China, it is of interest to note the policy of the American Government with regard to a related but utterly separate and distinct subject, the exportation of arms from the United States to China.

Under date April 26, 1929, a note was addressed by the Senior Minister of the Diplomatic Body at Peiping, on behalf of the foreign governments concerned, to the Minister for Foreign Affairs of the Chinese Government declaring the *cancellation* of an agreement, generally known as the "Arms Embargo Agreement," which had been entered into in 1919.

The agreement in question had provided for the imposition of restrictions on the exportation from foreign countries of arms to China and on the importation by foreign nationals of arms into China. By its terms, the Governments of Great Britain, Spain, Portugal, the United States, Russia, Brazil, France and Japan had agreed:

"Effectively to restrain their subjects and citizens from exporting to or importing into China arms and munitions of war material destined exclusively for their manufacture until the establishment of a government whose authority is recognized throughout the whole country and also to prohibit during the above period the delivery of arms and munitions for which contracts have already been made but not executed." In addition, several other governments had subsequently adhered to this provision.

*Prepared for Professor C. H. Blakeslee's Conference at Institute of Politics Williamstown, Massachusetts, August 25, 1930.



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By the action taken at Peiping on April 26, 1929, this agreement was terminated.

The exportation of arms from the United States to China was governed while the agreement was in force and still is governed by the President's Proclamation of March 4, 1922, issued in pursuance of a Joint Resolution of Congress approved January 31, 1922.

Under the provisions of this Proclamation it is unlawful to export to China, "except under such limitations and exceptions as the President prescribes, any arms or munitions of war from any place in the United States" until otherwise ordered by the President or by Congress; and the Secretary of State is authorized to prescribe the limitations and exceptions in the application.

The Secretary of State has, subsequently to the termination of the agreement, announced that exportation of arms or munitions of war for the use of the Chinese Government will be permitted when (1) the Chinese Legation in Washington has signified to the Department of State that such exportation is for the use of the Chinese Government and (2) license to export has been applied for and been granted.

The procedure followed by the United States in relation to the exportation of arms and munitions of war from the United States to China is not unique. It is a procedure which has been and is applied to the exportation of arms to several other countries.

The American Government has from time to time declared clearly the principles which underlie its "China Policy." Most of these principles have been tried out during a century and a half of American contact with China. In application, the Government endeavors to take into consideration all the facts available in regard to situations which develop and problems which arise, and it attempts to act with regard thereto in the light of the traditional attitude of the United States toward China.

Pursuing a course directed toward the protection of American lives and the safeguarding of American interests, wishing at all times to be liberally considerate of China's rights and interests and

aspirations, the American Government endeavors to co-operate with other Governments where reciprocal commitments and common responsibilities are involved; but it remains free to act independently—and it should be remembered that "action" may be either positive or negative—where, in the absence of a commitment or a common responsibility, a matter under consideration or at issue is of concern peculiarly to the United States and China or relates to a particular objective sought by another or other Powers but not by the United States. Ready to use diplomatic pressure or even armed forces when necessary for the protection of its nationals, it has no desire to interfere in China's internal affairs, and it seeks to avoid any activity which may be motivated by or may involve features of aggression.

In general, the policy of the United States with regard to China is clearly expressed and summarized in the treaty relating to principles and policies concerning China which was concluded at Washington in 1922, the guiding principles of which are summarized in Article I, as follows:

"The Contracting Powers, other than China, agree:

"(1) To respect the sovereignty, the independence, and the territorial and administrative integrity of China;

"(2) To provide the fullest and most unembarrassed opportunity to China to develop and maintain for herself an effective and stable government;

"(3) To use their influence for the purpose of effectually establishing and maintaining the principle of equal opportunity for the commerce and industry of all nations throughout the territory of China;

"(4) To refrain from taking advantage of conditions in China in order to seek special rights or privileges which would abridge the rights of subjects or citizens of friendly States, and from countenancing action inimical to the security of such states."

Wanted: 110 Sugar Mills and Five Refineries

Sugar Industry in China

CHINA consumes about 16,000,000 piculs of sugar every year. In the past numerous attempts have been made to develop a modern sugar industry in the country. But due to difficulty of transportation, conservativeness of farmers, political disturbances and lack of tariff protection, these attempts all failed to bring results. The first modern sugar factory in the country was the Asheho Beet Sugar Factory, near Harbin, started by a Pole in 1909. This factory had a daily slicing capacity of 3,000 piculs of sugar-beets and a yearly production of white sugar around 30,000 piculs. This sugar was sold locally and to Siberia. After the World War, political complications caused this factory to be closed down. At the same time as the Asheho factory was formed, some influential Chinese promoted the Hulan Sugar Factory, north of Harbin. But due to insufficient capital and inadequate management, it went into the hands of the Bank of Three Eastern provinces. It has not yet been put on a remunerative basis. In 1916, the South Manchuria Railway Co. established the South Manchuria Beet Sugar Factory at Mukden with a daily slicing capacity of 5,000 piculs of beets. Later another factory was set up at Tiehling by the same company. Two years ago these two factories were also shut down on account of heavy losses. In 1922, Tsao Ju-lin and others formed the Pu Yi Beet Sugar Factory at Tsinan. But when the revolutionary expedition reached Shantung in 1927, this factory was shut down for political reasons. The beet sugar industry is now therefore in a state of inactivity, although millions have been invested for its development.

The sugar refining industry is in no better condition. The only Chinese refinery is the China National Sugar Refining Company at Shanghai promoted by M. Y. San in 1922. It buys the raw brown sugar from Cuba and Java and refines it into white soft

sugars, which are in great demand on the market. Having secured government assistance in the exemption of tariff on imported raw sugars and of the likin on its products, it promised to be a good profit yielding concern. Two and a half million dollars of capital was subscribed in a short period of a few months. But due to dishonesty of management, the company got involved in financial complications which forced the factory to close down. Last year, the Ministry of Industry, Commerce and Labor, attempted to put this company on a going basis, but practical difficulties made all attempts for reorganization fruitless after six months of earnest exertions. It is to be noted that with government assistance sugar refining is not a profitless proposition. A good example is the Japanese Ming Hua Sugar Refinery in Shanghai which was planned at the same time as China National but has been operating only the last five years. With government assistance, honest management, business foresight, and sufficient financial backing, sugar refining is a profitable enterprise.

The failure of sugar refining industry in China is due primarily to the lack of experience on the part of Chinese sugar industrialists. A study of the production of the sugar regions reveals that there is a great potentiality for the development of sugar industry in China.

The production of sugar in China has been estimated from 4,000,000 to 6,000,000 piculs a year. Perhaps in former times of prosperity we did reach this high figure. But at present our former important sugar exporting centers like Amoy and Canton are importing large quantities of foreign sugar. It is therefore not unreasonable to take 4,000,000 piculs as the highest production at the present time.

The richest sugar cane producing regions are Szechuan, Kwangtung and Fukien. Kwangsi, Yunnan, Kiangsi and Chekiang also

produce cane in less quantities. The approximate distribution of sugar production is as follows:

	Piculs
Szechuan.	1,500,000
Kwangtung	1,200,000
Fukien	600,000
Other Provinces.	700,000
Total:	4,000,000

Szechuan has a favorable climate for cane cultivation. Neikang, Tsechow, Tzechuang are important centers of sugar manufacture. The brown and white sugars are sold locally and to neighboring provinces. The export from Chungking is only about 3,000 piculs a year.

Chaochow and Waichow are centers of sugar production in Kwangtung. About 1,000,000 piculs are annually exported from Swatow. Due to the characteristic taste of these native sugars, they still have a wide market in the country although they command a high price. However, Swatow is importing over 100,000 piculs of sugar annually for local consumption, showing clearly the inadequacy of the local sugar industry.

Fukien produces large amounts of sugar in the vicinity of Changchow. Twenty years ago Amoy was a center of sugar export, but the present time Amoy and Foochow import annually about 100,000 piculs each.

Small amounts of sugar are produced in Yunnan, Kiangsi and Chekiang. But they are only used for local consumption. These provinces all have possibilities of future development.

All the above mentioned provinces use sugar cane as the raw material. On account of the antiquated methods of manufacture, the products are not only of poor quality but the cost of production is very high. Since the world war, the sugar industry in Cuba, Java and Hawaii has been so highly developed and the price of sugar has been so much reduced that our native sugar industry finds it impossible to compete. Cane fields have been turned into fruit planting and other more profitable uses. Our sugar industry is truly in a state of wretchedness.

Our native method of manufacturing sugar is very wasteful. In modern practice we ought to be able to obtain at least eight parts of high grade sugar from 100 parts of cane of ordinary quality. But in China we only get about three piculs of sugar from 100 piculs of cane. In Szechuan, foreign sugar sells at exorbitant prices due to difficult transportation, native sugar have been fortunate to exist. Whereas in the seaboard provinces, like Fukien and Kwangtung, where cheap foreign sugar is easily accessible, local industries finds it almost impossible to carry on. It is therefore absolutely necessary for China to adopt modern methods of plantation and manufacture in order that we may enter the world competition.

If we turn to the Customs Reports, we find that in 1928 China imported over 13,000,000 piculs of sugar, which consist of the following different kinds:

	Piculs
Brown sugar	3,032,614
White sugar	6,169,406
Refined sugar	4,110,793
Rock candy	405,652

The most popular kind of sugar on the Chinese market is the "soft sugar," so called on account of its soft texture due to the presence of a small amount of moisture and syrup. It easily dissolves in water and appears to be sweeter than the dried sugar, the so-called granulated sugar which is more favored in western countries but only has a rather limited market in the East. Japan is now almost the only supplier of soft sugar to China. The Taikoo and the China Sugar Refineries, (two famous British sugar refineries in Hongkong), were unable to meet Japanese competition. The former just about maintains its position in south China, while the latter has been forced to close down due to unfavorable conditions. The Japanese refiners are not only financially powerful but manufacture a line of soft sugars of such superior quality, that the British refiners are unable to compete.

A further analysis of the consumption of foreign sugar *per capita* in China, shows the rapid increase of this foodstuff in the Chinese dietary. Assuming a population of four hundred million people, we calculate the consumption of foreign sugar *per capita* as follows:

	Quantity catties	Value Dollar cents
1912	1.14	7.38
1913	1.78	14.15
1914	1.56	12.06
1915	1.19	11.65
1916	1.29	14.10
1917	1.55	17.25
1918	2.18	23.35
1919	1.29	13.77
1920	0.96	15.25
1921	1.93	27.85
1922	1.92	23.90
1923	1.52	20.25
1924	2.31	29.70
1925	2.98	34.70
1926	2.90	31.85
1927	2.50	28.80
1928	3.43	37.75

The above table shows that in the last seventeen years, the sugar consumption in China was almost doubled. The import of 16,000,000 piculs of foreign sugar annually probably cost the Chinese people about \$16,000,000. If our sugar consumption is again doubled in the next seventeen years, it means that a total sum of \$240,000,000 will be spent on foreign sugar, not including native production.

According to the present rate of sugar consumption, we need:

- 60 cane sugar factories, each grinding 100,000 tons of sugar cane a year.
- 50 best sugar factories, each slicing 60,000 tons of beets a year.
- 5 sugar refineries, each refining 72,000 tons of sugar a year.

This will satisfy our present demand for sugar, but it will require an investment of \$250,000,000.

Economic Missions

SOME months ago, a German business mission toured the Far East seeking outlets for their trade. A British Economic and Canadian Mission are now in China and the Americans are talking about a similar investigation.

Since the Great War, Russia has ceased to be a customer, closing a market of 160,000,000 consumers. China has drifted into chaos and the purchasing power of its 450,000,000 people brought to the vanishing point. Outside of Japanese investments, no new capital has come into the country in eighteen years for development purposes. India, with its 350,000,000 people, has built up its textile, iron and steel industries to the point where it is no longer completely dependent upon Great Britain.

Russia and China with their combined populations of 600,000,000, one third of the world's total, are not buying as they did before the War. India is exporting textiles. In the meantime, Japan an importing nation before the War, is now an aggressive industrial giant supplying its own requirements and competing with Great Britain, Germany and America for world markets and world carrying trade. Russia has embarked on a program of industrial expansion which if only partially successful, will intensify the present world trade deadlock and menace the prosperity of the older industrial nations. China, for the next decade, will be a profitable market for certain lines of Western manufactured products, but in time this country will also take its place as an exporter.

Russia, as an outlet for the major lines of British, American and German manufactured products, will be closed in a few years. We have waited too long in recognizing Moscow, throwing the Communists back on their own resources and devices. They are now placing into practice their ideas of state controlled industry and agriculture, and will develop into a formidable and maleficent competitor. Unless China can be pacified, bolstered up from the outside and brought into line as an orderly consuming nation, the present world depression will continue.

A pacified and united China may help to relieve world unemployment for the next decade, but it will be a neck and neck race between Communism and Capitalism, with the odds on Moscow.

An Old Friend Passes

Soichiro Asano

DEAR to all Trans-Pacific travellers of the Pre-Earthquake era, was the genial, ever courteous, ever hospitable head of the old Toyo Kisen Kaisha, Mr. Soichiro Asano. His magnificent home on the Bluff at Yokohama was the scene of many wonderful gatherings introducing the foreigner to the notables of Japan, helping to disseminate a truer estimate of Japanese character and culture. Asano has been called the "international host" because of these delightful receptions which he made a feature of his steamship activities. Asano was one of the outstanding examples of Japan's self-made men, achieving by his own efforts a success and position in the industrial life of his country that made him world-famous. This old friend has passed away. Commenting on his career, and his influence on creating the present industrial prominence of the Empire, *The Japan Times* extends this tribute to his sterling worth:

"In the death of Soichiro Asano passes from the stage of modern Japan one of its most colorful and masterful personalities. His career was indeed a commentary on the age in which he lived. Born at a time when Japan was still in the grip of a passing feudalism, his life spanned the most momentous period of our history. The elements of power and of character which carried him far in worldly success were tempered in the traditions of an ancient order. They proved, however, more than sufficient to cope with the problems and the instruments of a modern industrial age. In this sense, his was truly a life which reflected progressive and adaptive Japan at her best.

"In the days of the Tokugawas there were merchants who rose to positions of wide influence, while the life of Hideyoshi is the story of a self-made man. Yet the romance of such lives was exceptional. The ancient order of things was a world of caste. Birth determined the range of one's activities: one might extend horizontally, but hardly vertically. All this was changed, however, with the advent of the Restoration. The Emperor Meiji granted from his all-seeing and benevolent wisdom, a Constitution to the country, and made merit the sole criterion of advancement in the new social order. His was indeed one of the rare incidents in history when a Sovereign, of his own free will, granted his subjects rights and liberties which they hardly dreamt of. An absolute monarch, yet he limited the exercising of his

own powers, in order to give his subjects greater scope for the exercise of theirs.

"Asano was thus fortunate in having been born in an age when he could develop to the full his remarkable powers. For his adoption as the son of a country doctor was not one which gave any promise of worldly success since, in the days of feudalism, the position of a physician was not much higher than that of the barber in the West, the precursor of the modern surgeon. Indeed it was said that his father combined the function of a mortician with that of healing, this incidentally being a combination of professions which assured patronage, either way the dice of life or death should fall.

"Thus it may be said that Asano had no advantages excepting the good fortune of having been born in an age of opportunities. But there were elements within him which destined him for

success. First was courage and initiative, second was a magnetic and persuasive personality, third was an immense optimism and a spirit and fire which nothing could daunt—and finally imagination which could envision, for instance, a great fleet of ocean liners sailing under his flag before he owned one ton of shipping.

"That the Toyo Kisen Kaisha—the Oriental Steamship line—which was the child of his creation and which long and proudly bore the flag of Nippon across the Pacific should finally have passed from under his control was in many ways a blow. His tremendous and far-flung industrial and commercial activities suffered severe reverses due to the hard times which followed the War. But in no way could it be said, because the steamers which bore the house flag of the Toyo Kisen Kaisha changed to the flag of the N.Y.K., that the work of Asano had gone for naught. The good will and the prestige which the T.K.K. had built up under the proud fostering of Asano is, to-day, as it was a decade ago, one of Japan's no mean assets.

To-day our industrial activity has placed us among the leading nations. When our limited natural resources are taken into account, it may be said that Japan may well be proud of her progress. And if an accounting of our industrial world should be taken it would be discovered that the brain, imagination and energy of Asano played a very important part in the creation of the New Japan.



Soichiro Asano—the "grand old man" of Japanese industry—who has been called the "international host," because of the delightful receptions he gave to newcomers to Japan. He was one of the Empire's best examples of self-made men.

Japan's Steel Mills Seek Export Trade

FOLLOWING closely on the announcement of a merger between the Japanese Government Steel Plant at Yawata with the leading private steel manufacturers of the country, comes the report that Yawata will allocate a certain tonnage for export to China; a definite bid for a market that outside of Manchuria has hitherto been practically closed to Japanese steel manufacturers.

According to the report, arrangements have been made between the Yawata Steel Works and Mitsui and Mitsubishi whereby these two companies will act as sales agents in China for the Yawata products, the Mitsubishi organization in Manchuria and Mitsui in all other parts of China. By the terms of the agreement the Mitsubishi take 1,200 tons a month of Yawata steel products for its territory and Mitsui about the same for the markets in China Proper, a rough total of 30,000 tons a year, or about 3 per cent of Yawata's output. It is provided in the contract that stocks of 1,000 tons shall be kept in Shanghai and 3,000 tons in Tientsin, with preference in immediate delivery of new stocks as required. This represents one of the first steps taken by Japan to open up an export market for her basic industries, other than textiles, and will be watched with interest, as upon its success will depend in a large measure the future of her overseas engineering business.

Considerable publicity has recently appeared in the Japanese press on the progress of negotiations for the merging of the government and private owned steel works, sanctioned by the Ministry of Commerce and Industry in September. The proposed merger provides for a large iron and steel company under joint government and private management, with the government works at Yawata as the main producing plant setting and controlling prices.

The sale of the government plant to private interests could not be carried out due to the inability of the latter to raise the capital required. The assets of the Government works are roughly appraised at Yen: 250,000,000 and by merging the private companies, the capitalization of the new combine is expected to be Yen: 500,000,000, of which half will be owned by the government and the remaining half by the private companies who will exchange their assets for shares in the new trust.

The combine is to include both steel makers and pig-iron producers. The properties and assets of the private companies will be written down in order to squeeze out the water in their capitalization, and their outstanding debts are to be paid in 20 years during which time an annual interest of two per cent will have to be accepted by creditors. The Yawata plant will be permitted to operate at its fullest producing capacity while the private mills will be used for supplementing its output. If any restriction in production is necessary, the private plants will have to slow up. Any private company whose creditors refuse to accept the 20 year repayment plan with its two per cent interest, will be left out of the merger.

This scheme, which controls the imports of pig-iron and manufacturing output will be supplemented by a co-operative sales plan, to further centralize control, eliminate competition and reduce overhead. The real test of the scheme will come when the Bill goes before the Diet, and valuation of the private properties comes up for discussion.

Although considerable opposition to the scheme is noticeable in the Japanese press, there is no doubt that it has been most carefully studied and represents the best thought of the leaders of Japanese finance and industry. It is apparent that if Japan's steel and engineering industries are to survive and relieve their present distress by creating an export outlet, the same intelligent co-operation that has enabled Japan's textile industries to expand in the face of world competition must be adopted. The present steel merger will tend to consolidate under one direction, the purchasing of iron ore in India, China, Malay States and elsewhere, its financing through one bank, transportation to Japan in Japanese vessels, its reduction to pig-iron, conversion into steel products and their sale at home and abroad.

The erection of huge steel plants in Asiatic Russia, (one at Magnitogorsk in the Urals having a capacity of 2,500,000 tons and one in the Altai with an output of 1,000,000 tons) will, exert a

powerful influence on the steel markets of Asia, and if the Soviet program is carried out, it will make a determined bid for the Chinese requirements.

It is hardly probable that in the next few years, China will be able to rehabilitate the Hanyehping Steel Works, with its indebtedness to the Japanese banks, amounting to approximately Yen: 50,000,000. To become an important factor in the Far Eastern steel trade Hanyehping will have to be practically rebuilt. Until the Soviet mills get into their producing stride, the Chinese market must be supplied from the outside, and here the new Japanese combine headed by Yawata stands a fair chance of getting a share of the business.

A New Treaty Friendship

THE world sugar crisis has created a keen rivalry between the leading cane producing countries for the China market. The entrance of Cuba and the beet sugar countries in the Far Eastern markets is a reply to the repeated refusal of Java to co-operate in restriction. The aggressive sales policy of the two largest producers has also had the effect of stimulating Japanese refiners to increased efforts to hold their hard won markets in China. The possibility of large scale Cuban competition in the Far East, where under certain conditions, a large market could be developed for her lower grade sugars, carrying with it the demand for an immense ocean tonnage to transport the cargoes, has made necessary closer relations between Japan and the Caribbean republic. Cuba has the product and Japan the merchant marine, with several lines on the Panama-New York and New Orleans run, which would make an ideal basis for a co-operative agreement.

The importance attributed in Cuba to establishing friendly relations with Japan, is evidenced by the recent appointment of Dr. Orestes Ferrara, Ambassador in Washington and Cuba's delegate to the League of Nations, as Ambassador to Japan. This appointment is made, according to reports from Havana, in order that Cuba may avail herself of the service of one of her outstanding diplomats and statesmen on concluding the commercial treaty.

The commercial treaty is one of the important steps in Cuba's program for combatting the economic crisis through the development of new markets for her products. Japan offers a market of potential importance for Cuban sugar, which is the most pressing item of the program, and Japan's industries may be able to furnish many of the manufactures that have previously been imported from the United States.

Gold Field in Manchuria

About 900 miles north-west of Harbin in the extreme northern point of Heilungkiang province is a district known as Kellari, which prospectors say is likely to become a second Klondike provided political conditions in the district ever become sufficiently stable for the gold mines to be worked.

The district is about 275 miles north of Hailar, in the Barga district, and is drained by the Kellari river, which has its course in the Great Hinghan mountain ranges.

When Russian influence was dominant in the Barga area, the Russian government, about 1901, granted a concession to a company known as the Upper Amur Gold Mining Company. The mines were worked from 1916 to 1920, and while considerable money was spent in prospecting before the gold-bearing stratum was discovered, the company was forced to discontinue its operations owing to the decline of Russian influence in the Barga territory.

The Chinese then organized a company known as the "Kuan Hsin Kunssu," but owing to primitive methods and the isolated location of the country little was accomplished, although it was reported that in one year the company, using some 150 workmen, succeeded in extracting about 300 pounds of gold.

Harnessing The Yellow River

AN American engineer in charge of the field work of the China International Famine Relief Commission, is completing the biggest engineering project in North China. The Saratsi irrigation project diverting the waters of the Yellow River through a series of canals in Suiyuan Province, will reclaim nearly two million acres of waste lands and bring them under cultivation. With this as a commencement, there is no reason why other equally beneficial irrigation systems should not be built further up the river to bring under cultivation immense tracts of land that now lie unproductive. Once China settles down to serious development of her resources, the improvement of the Yellow River and the construction of a series of barrages in its upper reaches, would duplicate in the desert of the Ordos the miracle of the Nile and made this part of China one of the most fertile in all Asia, solving not only China's food problem but opening up an immense territory to colonization. True, it would entail enormous initial expenditures, but what could be done in Egypt under a stable government and guarantees for loan redemption, can be done in China.

Our attention is called to this interesting and remarkable project by an interview appearing in the *Malaya Tribune* with Dr. Guenther Koehler, the young Leipzig geographer and authority on the Yellow River who discussed the question of regulating and harnessing its flow.

"Nothing," he said, "could be more fascinating than the study of this tremendous river with its vast resources of potential power. Indeed, it is so tremendous and so hostile to human progress that the task of taming it is a superhuman one, and must be regarded as such from the very beginning.

"For this reason, I am rather inclined to think that the project of constructing conservancy works in the vicinity of Ninghsia with the object of converting this local region into a Chinese Egypt is conceived on too small a scale.

"And I venture to say the same of the intended construction of the dams at Hokou. They are both excellent schemes in themselves, but their completion will not mean, in effect, the taming of the Yellow River, or even prevent the bed from silting up.

"My extensive investigations of the climatic conditions of the Hwang-Ho from source to mouth, have led me to believe that control should begin considerably further up-stream, with the construction of dams above Lanchow.

"This may sound rather impractical in view of the nature of the land, but not so when the important condition is fulfilled, and that is, the extensive afforestation of these regions.

Dr. Koehler, it might be explained, gathered his facts and material from a study of the international bibliography on the Yellow River. He has not visited the remote districts he describes with such minute detail in his recently-published book on this subject. He hopes, however, to be able to do so one day in the not too distant future.

In fact, he has received a call to occupy the Chair of Geography at the Chinese Yoh-shan University. And here Dr. Koehler revealed he had worked out comprehensive plans for the regulation of the Hwang-Ho almost throughout its entire course of 45,000 kilometers.

"Should my call to Changsha, in the Province of Hunan, materialize despite the uncertainty caused by the present difficult internal situation in China," concluded Dr. Koehler, "I hope to have an opportunity of submitting my plans for the harnessing of the Yellow River to the authoritative Chinese quarters."

The improvement of the Yellow River is one of the most difficult and important problems confronting China. The enormous volume of water that now rushes uselessly into the Gulf of Chihli breaking through its banks periodically and flooding vast tracts of country, might be controlled somewhere above Ninghsia and its force diverted into the deserts transforming them into cotton or grain fields.

To the various dams that control the Nile waters in Egypt, is to be added another at Lake Tsana in Abyssinia. The contract for its construction was concluded in April last between the Abyssinian Government and the J. G. White Company of New York. The contract price is \$20,000,000 to be raised by a bond issue, secured on the sale of water and guaranteed by the British Government of the Sudan. What was possible in Abyssinia, is possible in China as soon as conditions are stable and there is some protection

for life and property and security for the capital invested. The harnessing of the Yellow River, the reclaiming of the Ordos and adjacent desert regions, is one of the great world engineering feats to be carried out in the next two decades.

Potential Wealth of Manchuria

COMMENTING upon Japan's economic depression in an interview published in *The Japan Times*, Mr. J. Yamamoto, (former President of the South Manchuria Railway Company) after urging a more rapid industrialization of Japan, stressed the importance of developing at once the resources of the S.M.R. zone in order to relieve Japan of its dependence upon other countries for basic raw materials that can be obtained more cheaper from this source than anywhere else. Although most of Mr. Yamamoto's statements are more or less known he presents certain figures, which coming from such an authoritative source, are of interest in determining costs of production. Japan's importation of petroleum and its by products in 1928 amounted to 505 mill on gallons valued at Y.90,000,000 fertilizers valued at Y.16,000,000 and miscellaneous machinery valued at Y.132,000,000.

Mr. Yamamoto believes that all of the iron and coal imports into Japan from other parts of the world can be furnished from Manchuria within Japan's sphere of influence. Japan last year imported from abroad pig iron valued at 200 million yen.

"The Anzan Iron Works in South Manchuria is now producing two hundred thousand tons of iron yearly," said Mr. Yamamoto. "But I am sure this figure can be greatly augmented and to suffice all of Japan's needs for this metal. Within Japan's sphere of influence in Manchuria are contained beds of iron ore computed by experts at one billion five hundred million tons, two thirds of which are secreted above sea level. The cost of producing a ton of pig iron in Manchuria is about twenty yen, although it formerly cost forty-five yen. At its present figure pig iron smelted in Manchuria is by far the cheapest that can be had in the world.

Mr. Yamamoto explained that the supply of coal was equally abundant. The Fushun coal beds, having an average depth of six hundred feet, are reputed to be one of the richest in the world. The coal is moreover easy to mine since the bed rises virtually to the surface of the land. The cost of mining a ton of coal is placed roughly at two yen and fifty sen but Mr. Yamamoto is convinced that the price can be reduced to one yen and sixty sen, which he believes is the lowest price at which coal can be purchased in the lowest price at which coal can be purchased in the world market.

The petroleum imports of Japan for 1929 is placed at one million seven hundred thousand tons representing a value of roughly one hundred million yen. Mr. Yamamoto is confident that all of this import from other countries can be procured from Manchuria within Japan's sphere of influence.

"The Fushun coal bed has a layer of oil shale computed at five billion two hundred million tons," declared Mr. Yamamoto. "Even if we suppose that only five percent of the shale can be converted into petroleum the above figure represents a petroleum resource of two hundred and fifty million tons, enough to last Japan for many years, with the added and all important advantage of cutting off this heavy item from our country's foreign imports.

If all of Japan's requirement of petroleum, coal, iron and fertilizer could be furnished from Manchuria, as Mr. Yamamoto is convinced it is highly possible to do, this country's foreign imports would be cut off by over four hundred million yen yearly.

Japan Shipbuilders May Amalgamate

In order to tide over the present growing difficulty of business, shipbuilding representatives will shortly sit in conference with the representatives of the Government Departments concerned for the exchange of views on practical means of improving the situation.

Meanwhile, the sub-committee of the Government Industrial Rationalization Commission at its latest session came to an agreement on the suggestion that shipbuilding companies' merger on the most extensive scale possible.

In these circumstances, it is considered as quite likely that a huge amalgamation of Japan's shipbuilding companies will be realized in the near future.

Development of Modern Banks in China

By LI MING

THE use of money in China dates back to about 2,900 years before the Christian era. There were then two kinds of money, namely metallic (gold, silver and copper), and non-metallic currency consisting of pearls, jewels and cowry-shells. The use of currency of the second category was interdicted by law in the year 216 B.C.

The employment of money in China, in place of primitive barter, was the natural consequence of the gradual development of trade. While originating within the precincts of the country, uninfluenced by an impetus from outside sources, ancient China was not first in inventing money as a medium of currency. Metallic money is known to have existed in some other countries about 6,000 years before the Christian era, as is evidenced by the old Testament—long before China knew of its uses.

China's Invention

On the other hand, I can state with certainty that banking, as well as the use of bank-notes, of drafts and of cheques, are distinctly to be considered as an invention of China. All the rest of the world followed this country in the adoption of her early achievements—usually with a delay of hundreds of years.

Banking is a science which cannot be created within a span of years. Unconsciously it begins its modest career, developing in the course of centuries into a permanent trade with more or less clear purposes and aims. In attempting to trace back the chronology of banking in China, we arrive at the following classification:

(1) Banks in the sense of Public Provident Institutions. In China these were in existence from about 2200 to 247 B.C., being conducted exclusively by the State. The system of issuing money and advancing funds for productive purposes, or sacrificial or funeral rites, was clearly regulated under the Chou dynasty (1122—249 B.C.). Interest on loans for the acquisition of commodities were said to have been low, while advances for funeral expenses were granted free of interest.

(2) Banking as a secondary branch of general merchants' business—say between 200 B.C. and 900 A.D. It ought to be remembered that, at that time, the circulation of money in ancient China was ridiculously small. First and foremost this country always has been overwhelmingly agricultural, and there was no trade movement before the advent of the Han dynasty (206 B.C.). Manufacturing was confined to the most elementary output by home-industry. Therefore an elaborate banking and credit system was just as uncalled for, as it was impossible to develop and thrive. By far the bulk of transactions relative to the exchange of commodities was carried out in medieval China by means of primitive barter. Originally money was circulated by the State not as a

measure of values, but primarily as a regulator for price fluctuations of commodities. Yet there is evidence that during the Han dynasty money for the first time adopted the rôle which it has been retaining to this day—a legalized medium of circulation, meant to serve as a measure of values.

Some of ancient China's citizens had succeeded, in those remote ages, to amass fortunes through mining, agriculture, salt manufacturing or cattle raising. In times of political stress they granted loans to the ruling princes in exchange for the latter granting them monopolies. Slowly lending of money was extended to traders against excessively high rates of interest.

Ancient Banking

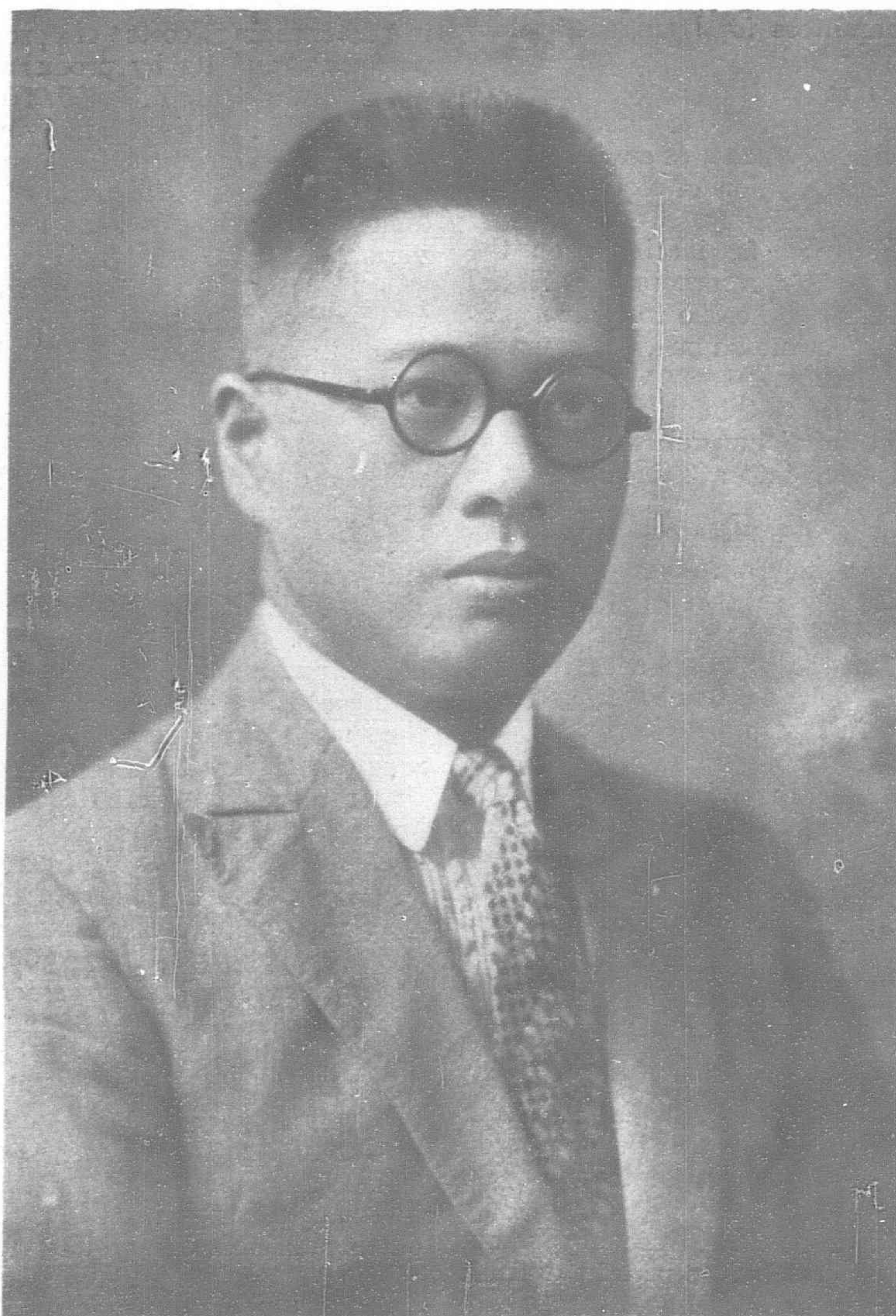
It would be a mistaken notion to consider that, up to this juncture, there had been even a vestige of a banking system in ancient China. Money lending alone cannot be termed banking. Certain branches of banking were, during the reign of the Han dynasty, gradually originating in an undefinable shape and carried on partly by the State, but mainly by an aggregation of rich merchants, pawnbrokers, silver smiths and money changers, a union which has managed to survive and to retain its vitality to this very day.

What we have been investigating so far certainly cannot be termed "banking," for money-lending alone often developed into mere usury. But the features already outlined became the precursors of the science of banking in China, a calling which actually originated in recognized form only many centuries thereafter.

The first real banking transaction, in the adopted sense of the word, can be traced back to the Tang dynasty, say to A.D. 806. At that period "fei-chien" (or "flying money") was first issued, representing an instrument in significance between a banknote and a bank draft. Travelling traders gladly carried with them the new paper money which became

redeemable upon presentation at any of the provincial treasuries. During the reign of the first emperor of the Sung dynasty (A.D. 960—1125) the Chinese public was enabled to exchange metallic currency for a sight draft on any provincial city, against a commission of 2 per cent. Unquestionably this transfer of funds represented a *bona fide* banking transaction—and would be considered in this light even under present-day conceptions. However, while banking operations were thus carried on in medieval China already about 1,100 years ago, it was not before the close of the reign of the Ming dynasty (1368—1644) that the first complete bank was functioning in this country.

(3) Guild Banking as Specific Trade. Very little authentic news is available about the origin and the development of guild banking. The latter may conveniently be classified into city



Mr. T. V. Soong, Minister of Finance and Leader of the Chinese Banking Group

corporations and the group of the Shansi Bankers. The former exist to this day and are known under the style of Native Banks. Their organization differs from that of the Shansi Banks inasmuch as it is confined to a local and autonomous working field, limited strictly to the township where the Native Bank is established. There are no close connections between Native Banks functioning in different cities, and statutes of one of these town guilds differ materially from the regulations of another guild of Native Banks situated elsewhere. The career and the significance of the old-style Native Banks are of much interest and importance. Unfortunately the particular subject under discussion to-day does not permit me to enlarge on the most romantic history of these institutions. Those sufficiently interested in a detailed description are referred to exhaustive articles, one from the pen of my collaborator, Percy Chu, which has appeared in the *North-China Daily News* of March 27, 1928, and another one written for the *China Year Book* for 1928 by E. Kann.

Shansi System

The now defunct guild of Shansi Bankers, though having been based on similar economic principles, differed radically from the Native Banks because, unlike the latter, the Shansi Banks throughout the country were united by one uniform and centralized system. The seat of the main guild was in Taiyuanfu, the capital of Shansi Province, from where the branch banks in the provinces were being directed. Furthermore, the Shansi Bankers, while specializing in the transfer of money within the country, actually attended to all branches of banking (and often wholesale merchandizing business) employing almost exclusively their own funds. The Native Banks, on the other hand, devoted their main endeavor to the granting of credits, obtaining the necessary means from depositors which signifies that they are working with other peoples' money.

Both categories of old-style banking institutions were responsible for the examination and valuation of sycee silver, for the bank clearings and for the fixing of market discount rates. In other words, they have for centuries carried out the functions of a governmental Central Bank, seeing that such an institution had not been in existence until comparatively recently. Both guilds were composed of organizations with unlimited liability on the part of their partnership-proprietors.

While the Native Bankers guilds continue to function, the once most powerful combine of the justly famous Shansi Banks has collapsed in 1911, having been torn to pieces by the tempest which has taken their tottering remains along with its furious force, in company with everything Imperial, Manchu, Throne and Empire.

These seemingly lengthy prefatory remarks are *de facto* a most incomplete effort at procuring evidence of banking developments in the China of yesterday. Space and time prevent more exhaustive deliberations upon a subject which certainly is deserving of much closer attention.

Modern Banks

Having thus prepared the ground for the presentation of our main topic "Modern Banks in China," we may now proceed towards

its closer discussion. Modern banking institutions in our country can conveniently be divided into two categories, namely Government Banks and Private Banks, the latter being almost exclusively joint-stock corporations with limited liability of its shareholders.

(4) Government Banks. These are all of recent origin and may be classified as follows: (a) Purely Government Banks, of which there exists one, the Central Bank of China, planned to act as the country's "Federal Reserve Bank;" (b) Semi-Government Banks, a portion of whose capital stock has been subscribed by the Government. The principal amongst these are the Bank of China and the Bank of Communications. (c) Banks in which a governmental department owns a part of the subscribed capital, for instance, the Manufacturers Bank of China, sponsored by the Ministry of Industry, Commerce and Labor. Similar semi-official banking concerns are now under contemplation, so for instance a National Navigation Bank and a Government Agricultural Bank; (d) Official banks of the various Provinces. The latter have not always been adhering to the best traditions of conservative banking methods. Forced by adverse economic conditions, some of these institutions have been responsible for currency inflation through the over-issue of paper money. Seeing that reliable data as to the doings of this class of banks is unavailable, it is impossible for me to treat this particular class of banks in detail. The Manufacturers Bank of China, being an entirely new foundation with excellent aims and prospects, cannot as yet claim or obtain particularized comment.

Banks Versus Politics

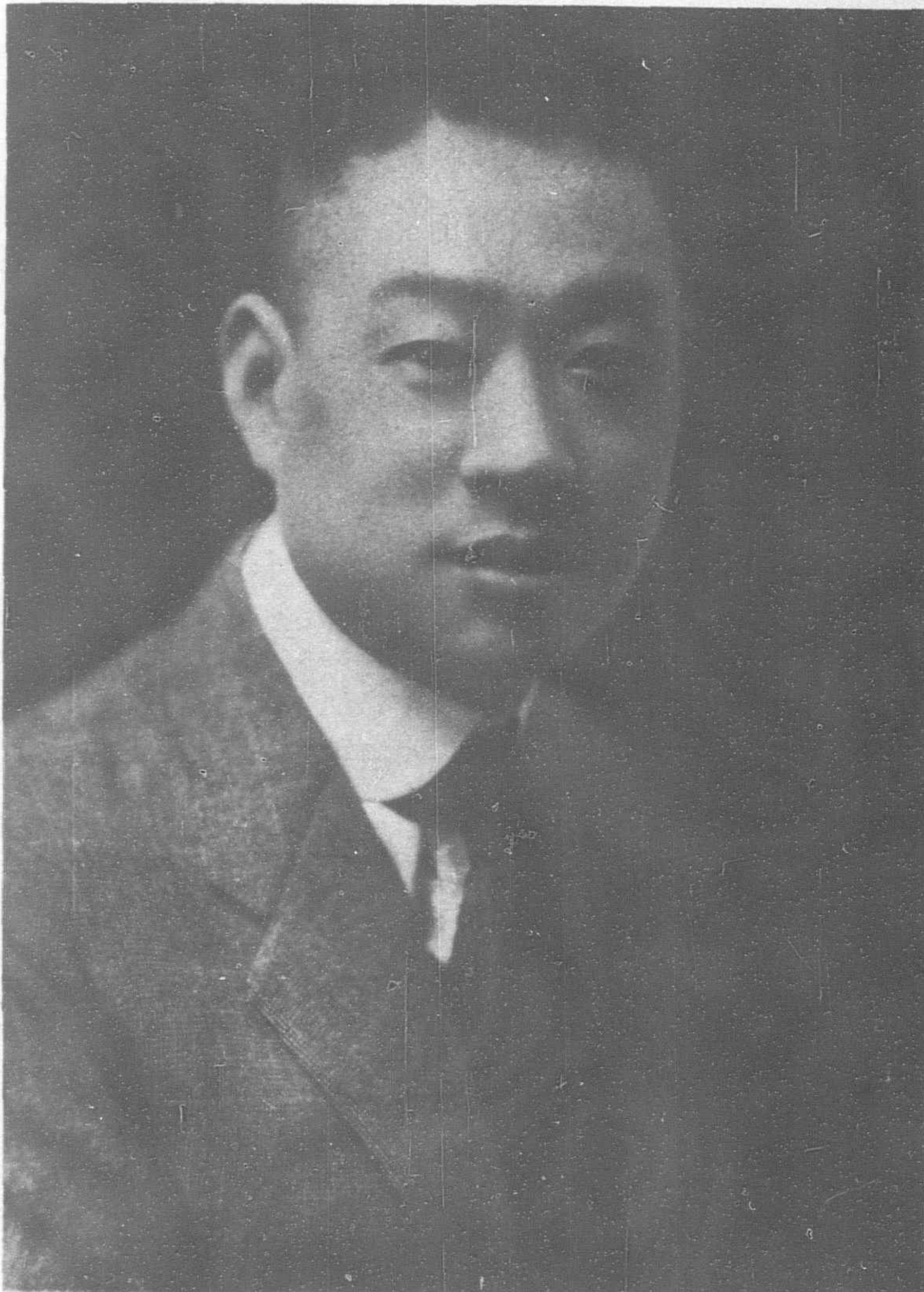
Conditions are, however, radically different as regards the Bank of China and the Bank of Communications, both of which have successfully withstood the baptism of fire, the severe trials brought about by the horrors of civil warfare and all the fearful consequences of intriguing politics. That they have managed to successfully withstand all these sufferings and emerged with shining armor, is a proof of their inner strength, their right to exist, and their destiny to flourish.

The importance of these two modern semi-government banks to the economic life of the regenerated China in general, and to modern banking in

particular, is so great that a brief outline of their history will be found interesting and valuable.

Following the signing of the Boxer Peace Protocol the necessity of instituting economic reforms became apparent. In 1903 an expert Commission on currency reforms, headed by the late Professor Jeremiah Jenks, was invited to come to China and make adequate recommendations. The experts' investigations resulted in proposals relative to the adoption of a gold standard for China; the scheme was accepted by the authorities, but never carried into effect.

One of the results of the desire for reform was the granting of the Board of Revenue's (Hu Pu) memorial, on March 16, 1904, petitioning the throne for the establishment of a Government Bank. This agreement marked the birth of the Hu Pu bank, with an authorized capital of four million taels, the first Government bank and one of the predecessors of the Bank of



Mr. Li Ming, Chairman of the Bank of China and Chairman of the Board of Directors and General Manager, Chekiang Industrial Bank, Ltd.

China. As the Manchu Government was then very hard up for funds, it took until the autumn of the following year, before the first instalment of 200,000 taels was forthcoming from the treasury, whereupon the new institution opened its doors on September 27, 1905. Beginning its career without competitors, the Hu Pu Bank did excellently. Shortly the Government rendered further capital payments, whereupon private subscriptions began to flow in.

On February 1908, the Throne agreed to an increase of the Hu Pu Bank's capital to 10 million taels, to be subscribed in equal portions by the Government and the people. At the same time it was decided to change the bank's name to "Ta Ching Bank." The latter's statutes gave—it the sole right of banknotes issue, —a provision which had never been observed. Taken altogether the Ta Ching Government Bank's business flourished.

A most fundamental change was forcibly brought about by the ravages caused by the 1911 revolution and the subsequent downfall of the Manchu-dynasty. In Peking and Tientsin there was a hurried issue of unsecured banknotes. But this made matters only worse. Runs were started on all the Ta Ching Bank's branches. In Shanghai \$2,000,000 were withdrawn within three days by anxious depositors; yet the Shanghai branch managed to withstand the storm. Hankow was less successful and had to close its doors. The bank's branches at Changsha, and also at Urga (Mongolia,—declared their independence and even changed their names. In the end the bank became totally exhausted and was unable to function.

A Tremendous Loss

In spite of the heavy run on its cash reserves the Shanghai branch of the Ta Ching Government Bank succeeded in weathering the storm. It was from Shanghai, and not from the prostrate Head Office at Peking, that the launching of a reorganized banking institution was planned and carried into effect. The news of the birth of the Bank of China was announced from Shanghai on February 5, 1912. It was surmised that the entire losses suffered by the now defunct Ta Ching Bank would not exceed the late Government's capital investment, so that the private shareholder's capital investment of Tls. 5,000,000 was paid back by deposit slips payable in four years with interest at five per cent. The new regulations of the Bank of China were promulgated by Presidential decree on April 15, 1913.

The authorized capital of the Bank of China was formerly fixed at 60 million dollars, of which \$19,760,000 were paid up, a status which was maintained until the late autumn of 1928. When final reconstruction took place.

Though rising amongst flames from the ruins of the Ta Ching Yin Hang, it was not willed by fate that the Bank of China should have a smooth road in front of itself. The eternal monetary crisis, the insatiable need for funds by the Peking Government, and finally the struggle for the Throne by the late Yuan Shih-kai, led to a Cabinet order (dated May 12, 1916) ordering both the Bank of China, and the Bank of Communications, to suspend payment under a Moratorium. However, the Shanghai branch ignored the governmental decree, thereby evading the Moratorium order. It continued to maintain its specie payments, after nominally transferring the local branch to two trustees. Since

then the affairs of the Bank of China have not merely been improving, but flourishing, thanks to excellent management and most devoted services rendered by the bank's staff.

In the middle of October, 1928, the Bank of China was once more re-organized (this time under peaceful conditions) as a semi-government institution. Its capital is now \$25,000,000, of which the Government has contributed \$5,000,000. The aims of the bank are clearly to function as an international exchange bank and devote itself principally to the development and to the financing of China's trade with foreign countries, on lines similar the Yokohama Specie Bank's system.

More than a year ago the Bank of China opened its own branch office in London, apart from having appointed banking correspondents all over the world. Its last balance sheet was published as of December 31, 1929. The principal items quoted from there are :

Assets :

Cash on hand ...	\$20,849,639
Loans on call ...	313,653,708
Investments in securities ...	33,210,590
Fixed loans ...	96,453,424
Reserves against Notes in circulation ...	197,728,286
Bank premises ...	6,386,284

Liabilities :

Capital authorized	\$25,000,000
Reserve funds ...	1,026,817
Reserve against bad debts ...	1,251,000
Current deposits...	382,785,585
Fixed deposits ...	55,311,005
Drafts issued ...	5,141,858
Notes in circulation ...	197,728,286

Working under most serious handicaps, the Bank of China succeeded in not merely surviving, but attaining a premier position amongst the modern commercial banks of China. Its excellent standing and repute is in no small degree due to the untiring efforts of its officers, amongst whom the names of Messrs. Chang Kia-ngau and Sun Hang-chang are most outstanding.

The second Government Bank, since converted into a semi-governmental institution, is the Bank of Communications. It received its charter from the Manchu Government on December 8, 1907. Its capital was fixed at 10 million taels, of which two-fifths was to be provided by the authorities, while the remaining three-fifths

were to be subscribed by the public. The avowed object of this bank was, as the name applies, to develop and finance means of communications, and especially to be instrumental in looking after the financing of the many newly planned railway lines. The revolution of 1911 caused the bank considerable losses.

Due to the change in the country's régime the Bank of Communications in 1914, secured a new charter by Presidential Mandate.

It can also not be denied that, as there were then two Government banks, where one was sufficient for the country's needs, a silent struggle for the custody of Government funds developed between the Bank of China and the Bank of Communications. Under its second charter the Bank of Communication's authorized capital was \$20,000,000, of which \$7,713,350 was paid up at the time the second reorganization became necessary.

In November, 1928, the Bank of Communications was re-organized into a semi-Government institution, on lines similar to



Mr. Chang Kia-ngau, Director and General Manager of the Bank of China



(Photo by Sanzetti)

Dr. H. L. Huang, Manager of the Ho Hong Bank,
Recently Appointed Vice Minister of Railways.
One of China's Promising Financiers

the ones applied to the Bank of China. The Ministry of Finance of the National Government of China sanctioned a new set of regulations pertaining to the Bank of Communications on November 17, 1928. The newly authorized capital was to be \$10,000,000, of which \$2,000,000 was supplied by the Government, while the remainder was subscribed by the general public. As was the case with the new statutes of the Bank of China these also provided for the Bank of Communications that the Head Office should henceforth be situated in Shanghai.

The new policy outlined for the reorganized Bank of Communications requires the latter to devote its energies to the support of industries and to the furtherance in the development of the country's means of communications. Removed from the evil influences of politics, the Bank of Communications of to-day has a wide and rich field of activities in immediate view, so that there is a most solid base for useful and remunerative work extant. Some of the gentlemen who have piloted the Bank of Communications out of the many danger zones through which it had to pass and who, moreover, are now guiding its destinies, are Messrs. J. P. Lou, Y. M. Chien and T. D. Woo.

The following figures are extracted from the last balance sheet (as of December 31, 1929) of the Bank of Communications:

Assets:

Fixed loans	...	...	...	...	\$44,100,492
Overdrawn current accounts	...	...	...	...	74,743,450
Bills purchased	...	...	...	...	2,090,495
Land and buildings	...	...	...	...	2,506,678
Cash in hand and at banks	...	...	...	...	41,994,861
Reserve against notes issued	...	...	...	...	69,221,511
Investments in securities	...	...	...	...	8,602,075
Documentary bills	...	...	...	...	1,639,433

Liabilities:

Capital authorized	...	...	...	...	\$10,000,000
Reserves	...	...	...	...	2,102,723
Reserve for doubtful debts	...	...	...	...	3,878,297
Fixed Deposits	...	...	...	...	35,938,503
Current accounts	...	...	...	...	102,854,202
Banknotes issued	...	...	...	...	69,221,511
Sundry creditors	...	...	...	...	20,100,000
Drafts issued	...	...	...	...	1,795,612

China has now one real and exclusively Government Bank, The Central Bank of China, with Head Offices at Shanghai. The foundation of this most modern institution has been planned and carried into effect by our present Minister of Finance, Mr. T. V. Soong, who has been acting as the bank's first Governor. The Central Bank has a paid up capital of \$20,000,000, furnished entirely by the Government. There are no private shareholders, though the influx of private capital, at a later stage, is not excluded.

The Central Bank is to serve purely in the capacity of a Government institution, as bankers bank, holding Customs, Salt and other Government deposits, managing the Central Mint, attending to the country's loan services, placing new loan issues on the market, issuing banknotes, etc. etc.

Due to the almost incessant civil warfare the Central Bank has opened but few branches in the interior of the country. After an existence of two years, the entire note circulation of the bank is still below 20 million dollars, more than fully covered by specie and first class securities.

The full story of the inauguration of the Central Bank of China, as well as a copy of the Charter of the bank and also its regulations, have been published by E. Kann in the (*China Year Book* for 1930.) Therefore I need not repeat here the contents of these important and interesting documents.

The following figures represent a statement of condition of the Central Bank of China, as of August 31, 1930:

Assets:

Cash	...	...	...	...	\$11,312,567
Due from banks	...	...	...	...	22,505,638
Reserve against notes issued	...	...	...	...	17,505,218
Bills discounted	...	...	...	...	6,182,609
Loans and overdrafts	...	...	...	...	24,215,330
Bank promises	...	...	...	...	3,190,955
Sundry debtors	...	...	...	...	3,082,713
Accounts receivable	...	...	...	...	6,095,218

Liabilities:

Capital	...	...	...	...	\$20,000,000
Reserve funds	...	...	...	...	1,192,682
Bank notes issued	...	...	...	...	17,505,218
Due to banks	...	...	...	...	4,464,681
Current accounts	...	...	...	...	41,119,929
Sundry creditors	...	...	...	...	2,616,062
Accounts payable	...	...	...	...	2,515,309
Net profit brought forward	...	...	...	...	1,927,195

Provincial Banks

In a certain sense the Provincial Banks have to be considered modern Chinese banks. A century ago they functioned as Government Money Shops, but shortly after the opening of the recent century they were either reorganized or created on more or less modern lines. Seeing that the capital is almost invariably provided by the respective province, without participation of private funds, it is not deemed necessary to publish balance sheet for the information of the general public, or to acquaint the world with the doings of these institutions. Although we know a good deal about the organization and the progress of provincial banks in China, it cannot be said that we have sufficient authentic data at our disposal to give detailed descriptions about the actual state of affairs.

Almost every province has its official bank. And almost every one of these has the right of note issue, a privilege which is made full use of to the detriment of the economic situation of the districts concerned. The story of over issue and wholesale devaluation and repudiation of banknotes issued is a long and sad one. The organization of the different provincial banks is by no means uniform; there is hardly any inter-dependence or co-operation between the various provinces in this respect.

(5) The foundation of modern Chinese banks had its root in the desire and the necessity that Chinese capital and Chinese brains ought to participate in the financing of the country's foreign trade. The first modern bank to open its doors was the Imperial Bank of China (now known as "Commercial Bank of China"), founded by the late Sheng Kung-pao, the promoter of the China Merchants' Steam Navigation Co. and the Han Yang Iron Works. The Tientsin branch was plundered during the Boxer Rebellion, and not reopened again, leaving the Shanghai office as sole branch.

The establishment of modern style banks according to dates may be indicated as follows:

Numbers of the Banks Established.

1897	...	...	...	...	...	...	...	1
1906	...	...	...	...	...	...	...	1
1907	...	...	...	...	...	...	...	1
1908	...	...	...	...	...	...	...	3
1909	...	...	...	...	...	...	...	0
1910	...	...	...	...	...	...	...	2
1911	...	...	...	...	...	...	...	—
1912	...	...	...	...	...	...	...	5
1913	...	...	...	...	...	...	...	3
1914	...	...	...	...	...	...	...	1
1915	...	...	...	...	...	...	...	3
1916	...	...	...	...	...	...	...	2
1917	...	...	...	...	...	...	...	2
1918	...	...	...	...	...	...	...	10
1919	...	...	...	...	...	...	...	11
1920	...	...	...	...	...	...	...	13
1921	...	...	...	...	...	...	...	23
1922	...	...	...	...	...	...	...	18
1923	...	...	...	...	...	...	...	15
1924	...	...	...	...	...	...	...	8
1925-1930 about	...	...	...	...	...	...	...	70

It is perhaps somewhat difficult to draw the border as to the right of a financial institution to be styled a bank, and moreover, a modern bank. But we have certainly this day in China at least 200 institutions deserving of this name. Quite a number of modern banks had to close their doors, often as a result of speculative transactions. Taking into account that by far the majority of modern banks in this country has been founded during the past twenty years, it will be admitted that progress was rather rapid.

As to the scope of activity of the modern Chinese banks it can very briefly be stated with accuracy that the work of these institutions is practically the same as that of the foreign exchange banks in China, to wit:

Acceptance of deposits: current, fixed and savings.

Granting of advances: loans and overdrafts.

Discounting bills.

Transfer of funds: inland and to foreign countries.

Dealings in gold and silver bullion.

Foreign exchange: financing of imports from abroad by opening credits with foreign correspondents; financing of exports from China to foreign lands by purchasing documentary bills.

Trust business: Purchase and sale of bonds and stocks on behalf of clients. Safe custody on behalf of the public.

The direct import of goods from abroad by Chinese wholesale merchants has been made possible and developed to a considerable extent thanks to the active assistance rendered by the modern style Chinese exchange banks. Dealing in foreign exchange on the part of these institutions is of recent origin and can be traced back to 1918. Before that date no organized attempt was made in this direction.

Savings Departments

Also of comparatively recent origin is the establishment of well planned Savings Departments attached to many of the Chinese modern banks. In former times the man in the street kept his meager savings at home in dusty drawers, while the farmer buried his metallic savings in the ground. It required enormous labor and skill to convince the people of the advantages which will accrue to them and to their country if they make their savings work and earn interest under the guidance of modern banks of good standing. A man who accomplished singly more than anybody else in this particular direction is my colleague and old friend K. P. Chen. Through his untiring efforts he conferred benefits not only on the bank which he founded and developed into one of the foremost financial institutions in China, but equally to his friendly competitors and the saving public in particular.

The working methods of savings departments of the modern Chinese banks were recently described in detail by the English weekly *Finance and Commerce*. In the same measure as the habit becomes more and more popular there is a desire on the part of the management of all the banks concerned to not only meet the wishes of the numerous small depositors, but to make their savings doubly secure. In order to reach and ensure this aim most of the banks concerned have agreed on the following

measures, for which the Chekiang Industrial Bank has not merely stood from the outset, but which it has actually put into practice in co-operation with the Shanghai Commercial Savings Banks and National Commercial Bank.

These reforms are based on the recognition of the fact that the Savings department must be considered a separate unit of the bank, with its own special capital, its special reserves and its separate accounting system. Beginning from October, 1930, we are publishing quarterly detailed balance sheets of our savings departments, giving full particulars to the depositors and the public at large about the nature and value of our investment. Eventual profits accruing in the Savings departments are not to be distributed as dividends, but are to be retained there as reserves. The purpose of these precautionary measure is mainly to provide absolute safety for the depositors. In the event of a bank being forced to enter into liquidation the management wishes to guarantee the holder of savings deposits that their claim should be first considered, before the general creditors are being attended to.

This branch of banking is still in its infancy. And yet, I am inclined to state that, notwithstanding the short period this class of deposits is being catered for, there are to-day, at a rough estimate, savings deposit with modern Chinese banks in Shanghai alone to the extent of at least 90 million dollars. Very much more can and will be done in this direction, a movement which positively is of great value to the people.

The issue of banknotes by modern Chinese banks, principally Government chartered ones, is growing rapidly. It can safely be estimated that, at the beginning of October, 1930, the notes issued by nine Shanghai modern style Chinese banks, and redeemable in Shanghai, aggregate about 240 million dollars, a figure which shows that the utmost confidence is being bestowed upon these institutions. The notes are readily redeemable upon presentation.

Previous attempts at founding Sino-Foreign banks in China have not been successful. The Exchange Bank of China, the Sino-Scandinavian Bank, and the Chinese-American Bank of Commerce had to enter into liquidation. A certain number of Sino-Japanese banks still exists in Manchuria, but none of these calls for outstanding comment.

For years past commercial schools in China have opened special courses for banking. Returned students, who have gone in for economics and banking abroad, are largely employed by modern Chinese banks. Textbooks on banking and currency are widely studied by Chinese banking assistants. Recently the Shanghai Commercial and Savings Bank, as well as the Bank of China, have begun with the issue of a monthly magazine on finance and banking, mainly for their own employees. There is an excellent weekly issued in the Chinese language by the Bankers Association, under the style of *The Bankers Weekly*. The Bank of China has recently opened its own research department, where most useful statistical work is being done. We are glad to possess a number of scientific bankers, the best known names being Singloh Hsu and Chang Kia-ngau, K. P. Chen and Tsuyee Pei.

All the modern Chinese banks have to be registered with the Ministry of Finance, and their statutes approved there. They are to issue bi-annually audited balance sheets and to generally conform to the banking laws of the country. Almost all of the modern banks have adopted the foreign system of bookkeeping.

In order to safeguard their interests and to attain uniformity in policy the modern Chinese banks of good standing have united themselves into a Bankers Association. Same was founded in March, 1917, at Shanghai, (but not formally opened until July, 1918) with the following original members: Bank of China, Bank of Communications, National Commercial Bank, Chekiang Industrial Bank, Chung Foo Union Bank, Salt Industrial Bank and Shanghai Commercial and Savings Bank. In October, 1930, the Bankers Association at Shanghai had 22 local members. There, as well as in Peking and Hankow the local Associations are housed in their own, most excellent buildings.

The local Bankers Associations are united into one National Bankers Association, whose delegates meet from time to time in the different cities in order to discuss common affairs and to propose economic and banking reforms. Strictly speaking it is justified to consider the organization of the Bankers Association as a modernized system of the old banking guilds, which have recognized the necessity to work harmoniously on common ground and for a common aim.

(Continued on page 638).

Problems of the Formosan Sugar Industry

How Japan is Meeting Competition by the Application of Intensive Cultivation and Seed Selection

RECENT sales at one cent a pound of 21,000 tons of Cuban sugar destined for China, the lowest price for Cuban raws yet recorded, has focussed the attention of the sugar world on the possibilities of this country as an outlet for their surplus, and started a cut-throat competition between Java and Japan to hold their position in this trade. Alarmed at the slash in Cuban raws, the Java Sugar Producers secretly lowered their prices and quoted special conditions for the sale of big quantities for China. The fight between Java and Cuba determined the Japanese to make a supreme effort to recapture the China market and by an aggressive sales policy have succeeded since April last in again creating a huge demand for the Formosan product. It is estimated that Japan's sugar exports to China this year, will surpass last year's record of 2,379,588 piculs (140,000 tons).

The growth of the cane sugar industry in Formosa during the last two decades and the important part played in the industrial and commercial life of the country is one of the achievements in Japan's progress that testify to the ability of its people to surmount almost insuperable difficulties. To-day, Japan is practically self sufficient in the supply of sugar, with at least one quarter of the crop available for export. This enormous expansion in twenty years from the old style muscovado system, into a modern milling industry, has been greatly assisted by the Japanese Government, which has fostered and encouraged domestic production by financial support in various forms.

Although the Formosan sugar producers owe much of their success to the application of modern milling methods, the recent advance of the industry is due more to intensive cultivation and selection of seed canes. The following article on the problems confronting the Formosan sugar industry, give an accurate idea of what is being accomplished along these lines.

For many years the Japanese sugar producers, had been endeavoring to reach the stage of development where their supply of raw sugars produced in Japanese territory would be sufficient for all their needs, and this long-cherished hope was realized in the season of 1928-1929. Production this season 1929-1930, is likely to go beyond that stage. Until the end of 1926, production was rather irregular, one year showing an increase, another year a decrease. During the last few years, however, production has increased, following a greater yield from cane. For this season the estimate is 13,175,000 picul of centrifugals. The summary of production and yield is as follows:—

			Centrifugals Production	Yield Per cent.
1920-21	...	...	4,019,482 piculs	9.45
1921-22	...	...	5,729,801	9.54
1922-23	...	...	5,799,047	9.57

Season			Centrifugals Production	Yield Per cent.
1923-24	...	...	7,348,222	10.21
1924-25	...	...	7,768,667	9.79
1925-26	...	...	8,113,446	10.49
1926-27	...	...	6,709,162	10.34
1927-28	...	...	9,527,686	11.13
1928-29	...	...	12,175,874	11.73
1929-30 (estimate)	...	...	13,175,000	12.67

Primarily the state of the sugar industry depends upon the growth of sugar cane, so that this recent development may be attributed to improvement in agricultural methods, adoption of the large-stem cane, improvements in the land, in irrigation, in fertilizing, and the extermination of pests, in other words, to intensive cultivation. The area planted with sugar cane has decreased, while there has been a tremendous increase in production. The crop of sugar cane grown has increased 2.5 times per "ko"—(about two acres), as indicated in the following table:—



Selected Cane in the Fields of the Formosa Sugar Manufacturing Company

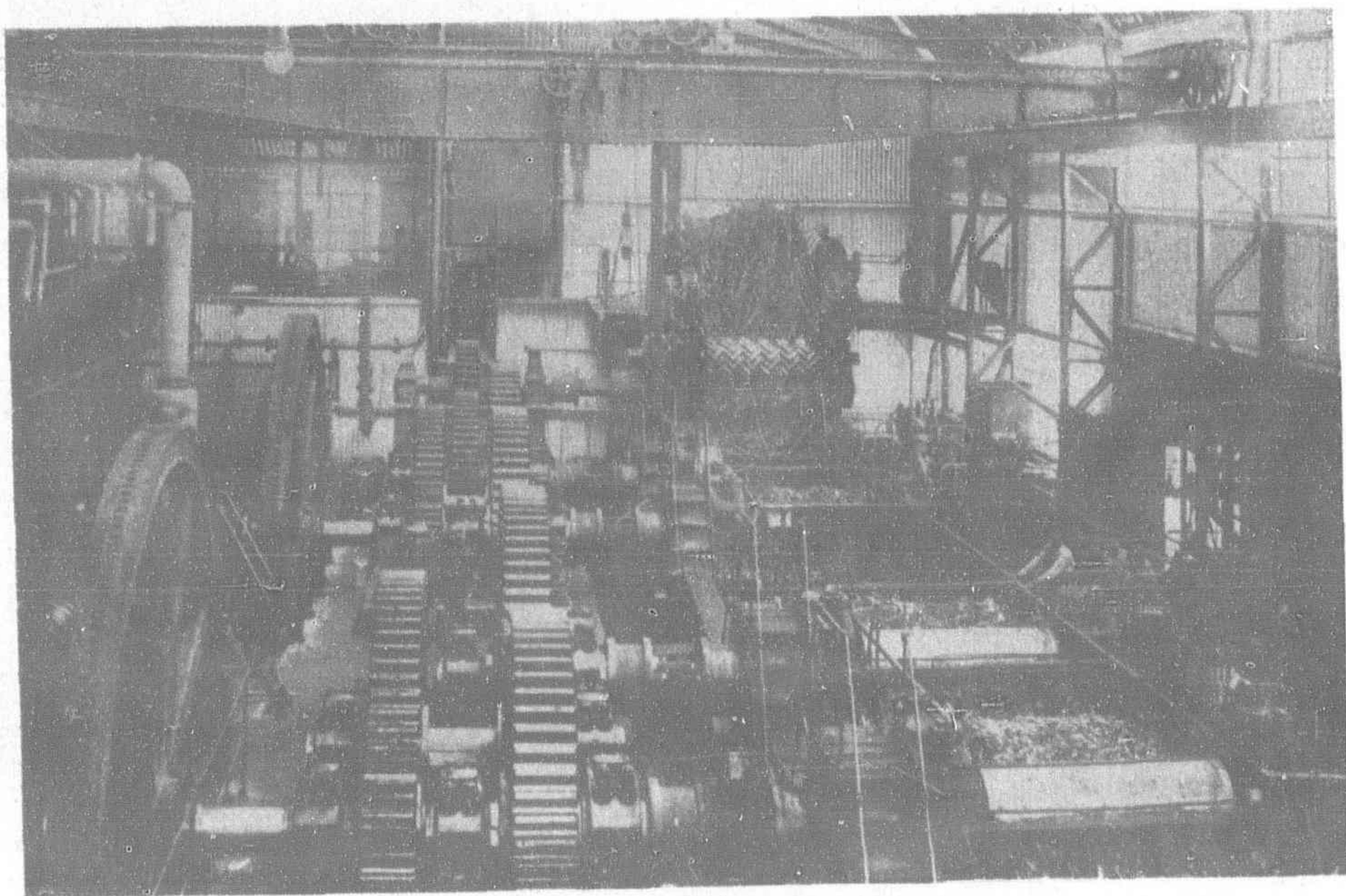
Season		Area Planted	Crop per "ko" kin
1920-21	...	106,701	43,500
1921-22	...	132,709	48,600
1922-23	...	110,044	59,100
1923-24	...	112,923	66,400
1924-25	...	114,469	69,500
1925-26	...	106,769	72,300
1926-27	...	86,654	74,800
1927-28	...	92,110	92,800
1928-29	...	103,985	106,000
1929-30 (estimate)	...	94,961	111,527

The possession of a great area of cane fields is no longer a point of pride to the sugar manufacturer; who is making strenuous efforts to realize a maximum crop on a minimum area. The success attained during the last few years, partly attributed to continuing good weather is due to fundamental reasons. Compared with Java and Hawaii, Formosa is still far behind, but the following comparison shows that Formosa, nevertheless, is steadily gaining:

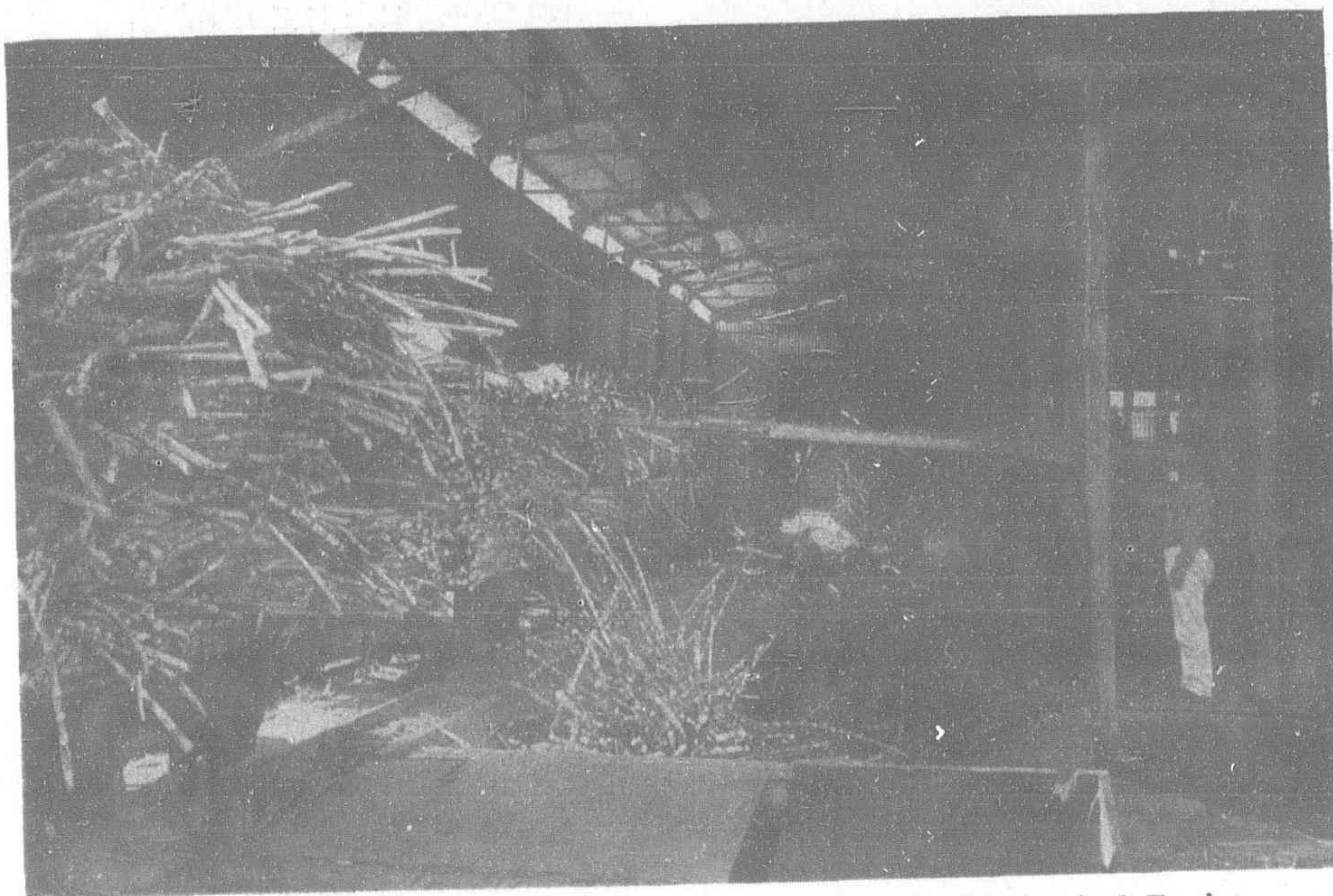
Season			Sugar production per "ko" in piculs.		
			Formosa	Java	Hawaii
1920-21	...	...	38	159	181
1921-22	...	...	43	170	164
1922-23	...	...	53	178	171
1923-24	...	...	65	178	229
1924-25	...	...	62	188	231
1925-26	...	...	76	200	234
1926-27	...	...	78	182	236
1927-28	...	...	103	209	258
1928-29	...	...	124	249	260
1929-30	...	...	141	—	—

A MODERN SUGAR MILL IN FORMOSA

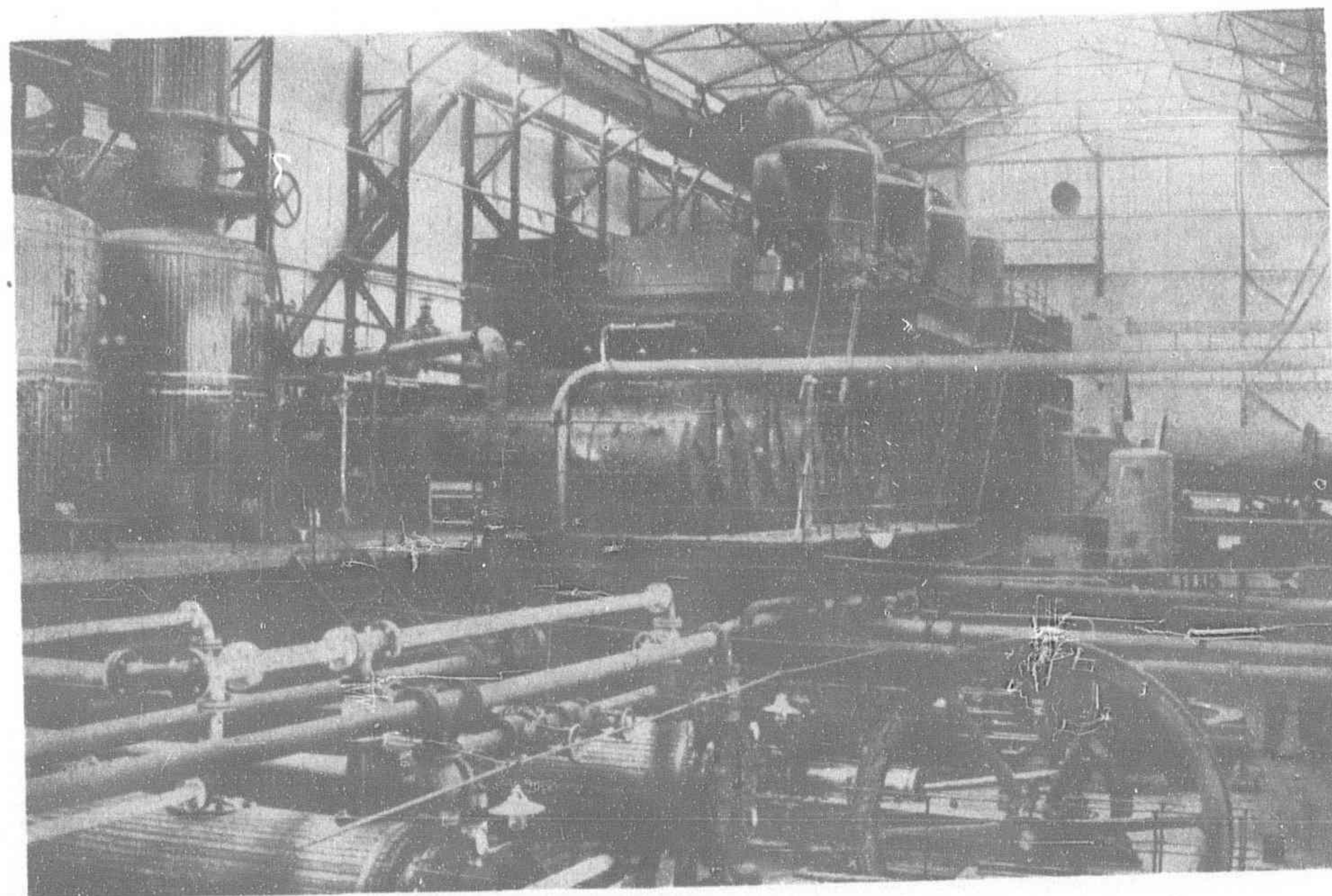
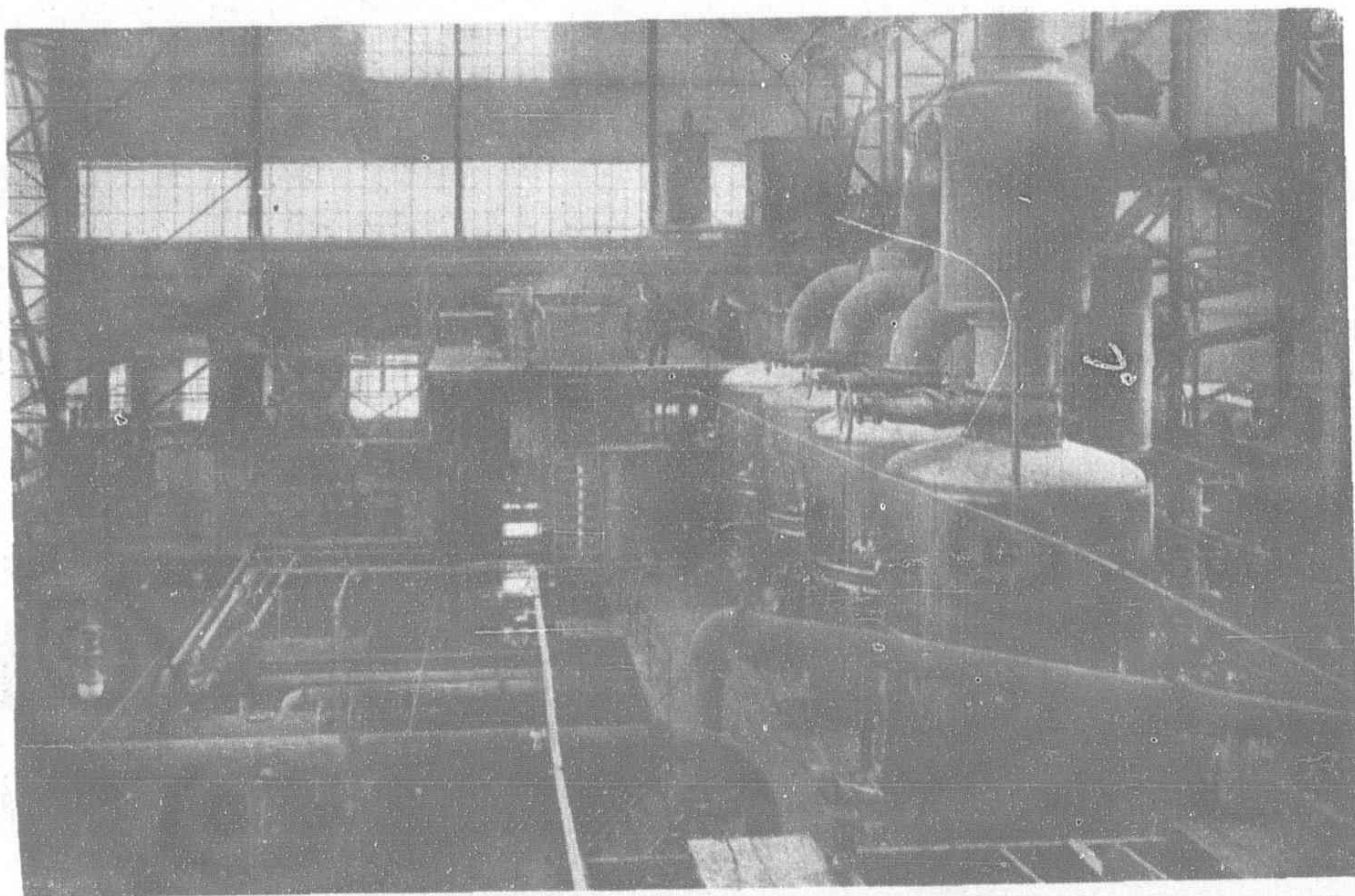
Mill No. 1 of the Dai Nippon Seito Kabushiki Kaisha (Japan Sugar Manufacturing Co., Ltd.)



Nine Roller Mill and Crusher

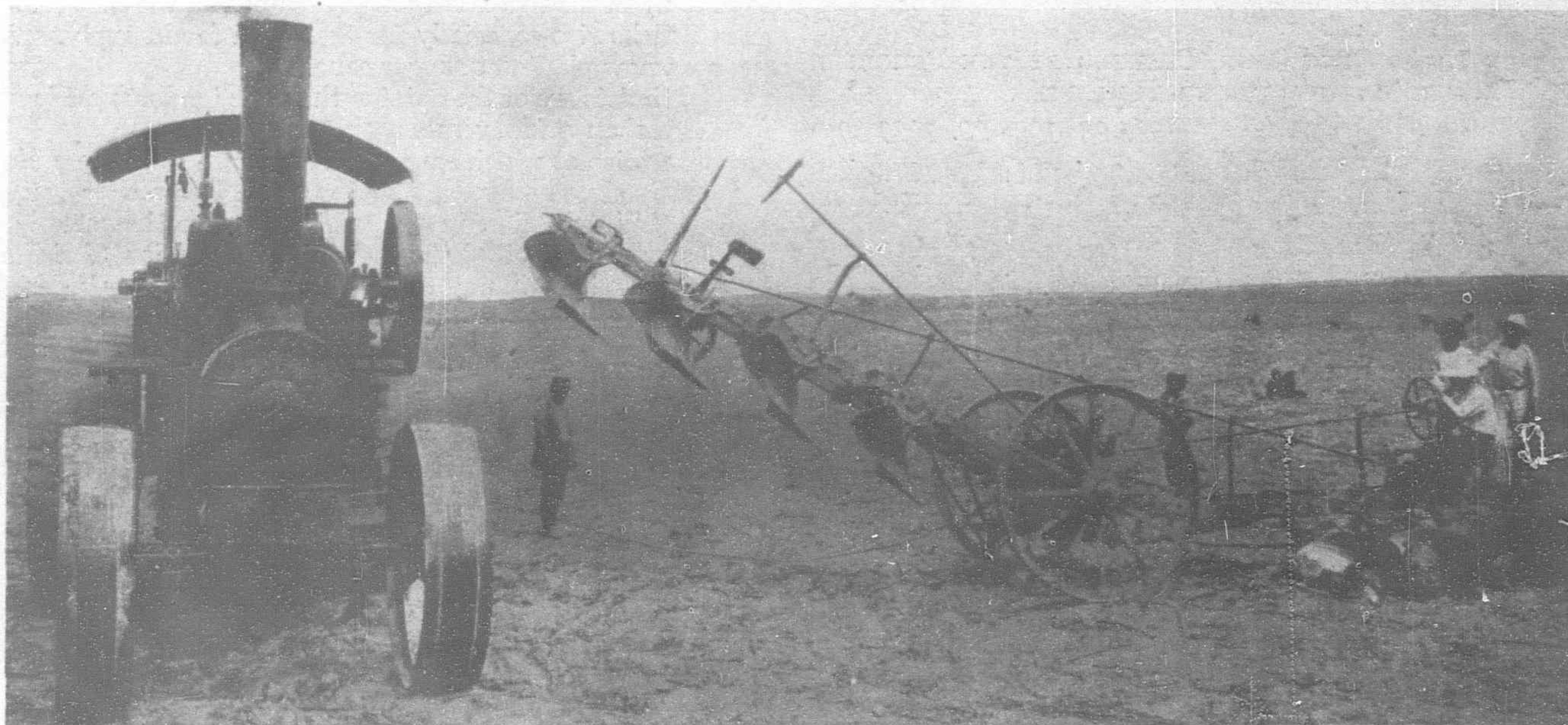
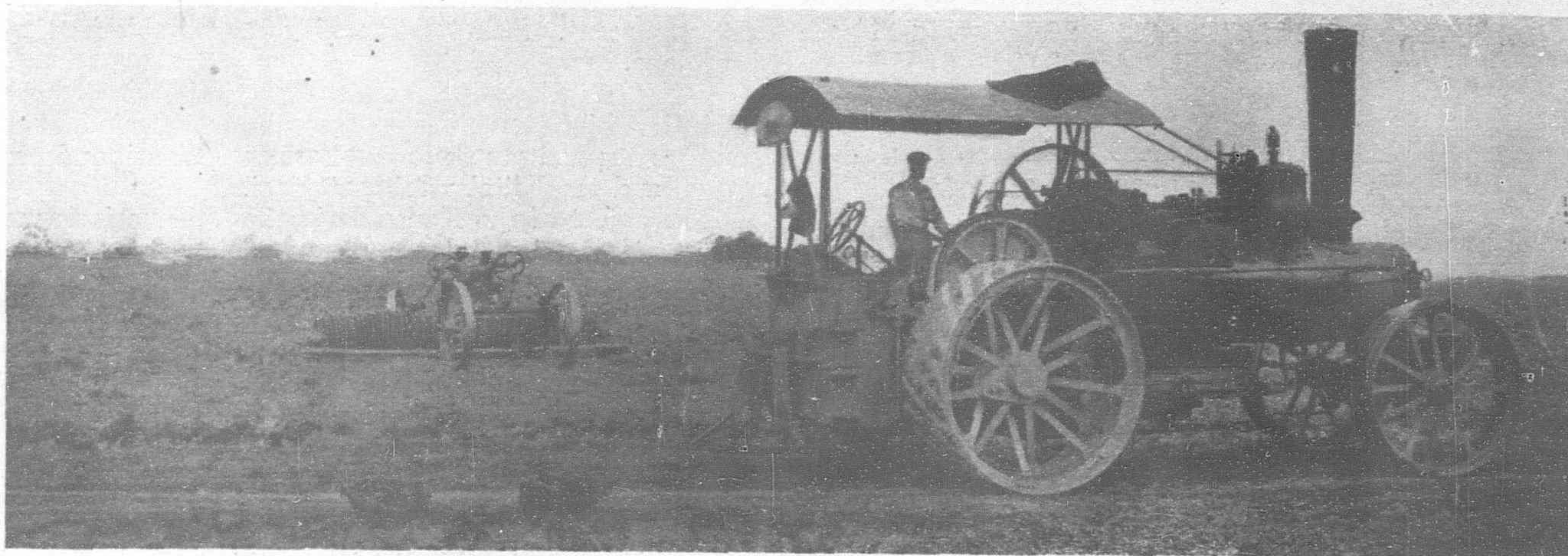
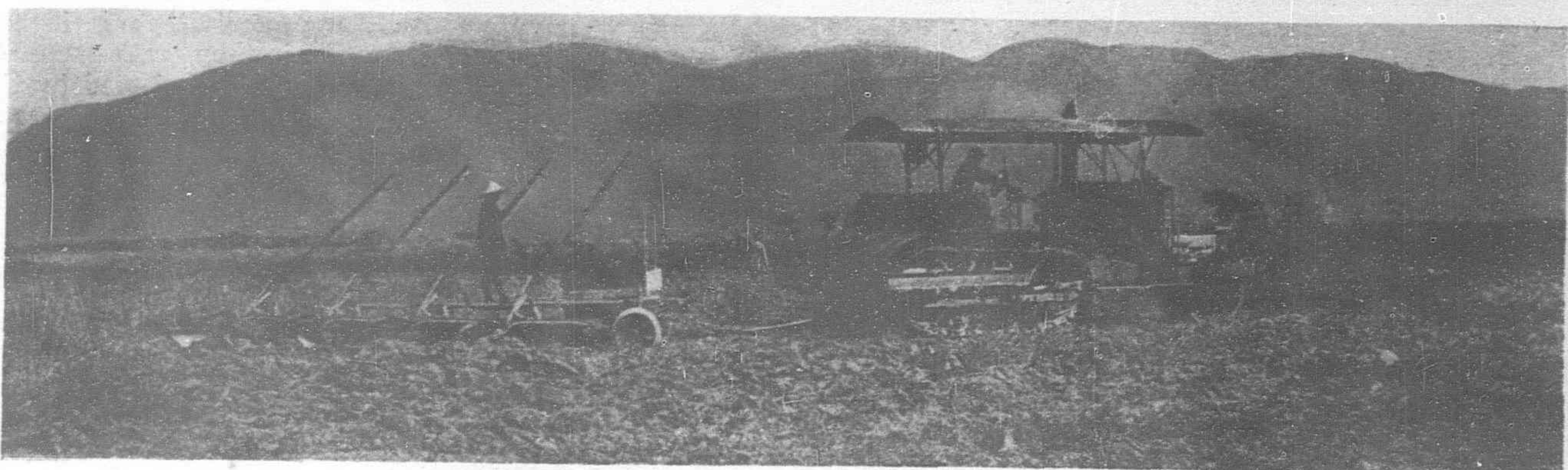
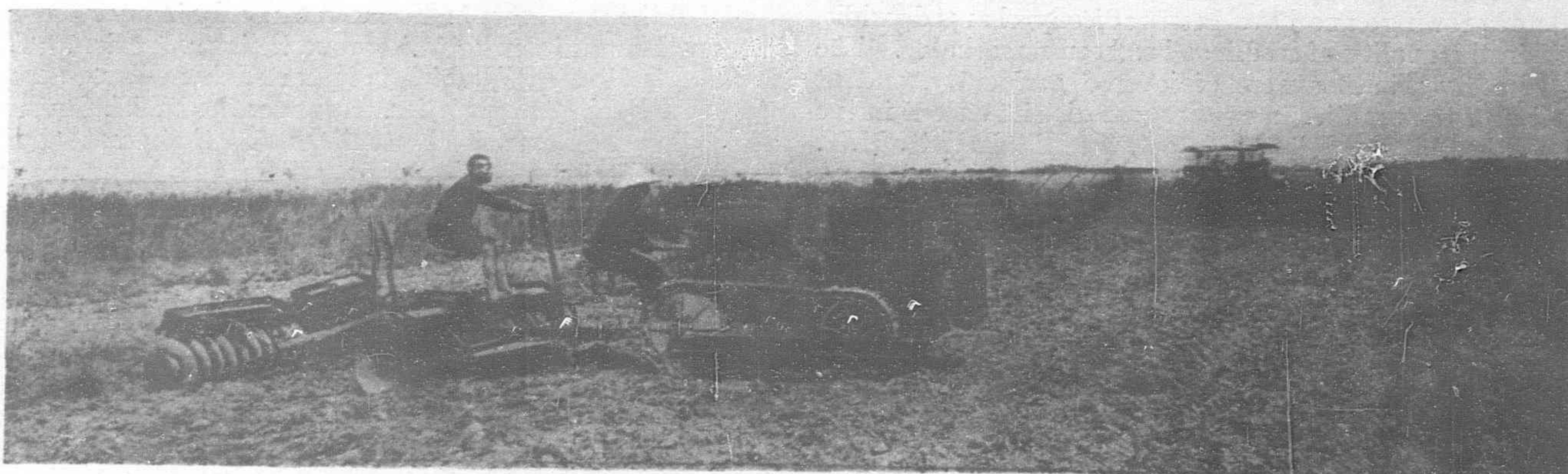


Showing Cars being Unloaded into Mill Conveyor by Mechanical Device



Sugar Boiling Floor: Showing Clarifiers and Quadruple Evaporator on Left and Vacuum Pans and Crystallizers on Right, Vacuum Pumps on Lower Level

UP TO DATE MECHANICAL PLOWING IN FORMOSA



The average production per "ko" ten years ago was less than one-fourth than in Java and Hawaii; but last season, 1928-29, it had risen to about one-half that in Java.

Methods of growing cane have been radically changed, while, improvement in the quality of seedlings has been remarkable. The advantages of early planting were discovered accidentally, and at present this is now the practice in every sugar district except in the rice districts of the Teikoku Seito K.K., and the Niitaka Seito K.K. Formerly cane was planted between December and April, and harvested after 12 months, but according to the new system the cane is planted between July and October, and the period of maturity is prolonged six months, greatly contributing to an increase in the crop per "ko."

The adoption of the large stem cane has also been a great factor in the improvement of crop and yield. Up to the season of 1923-24, one-hundred per cent. of the cane planted in Formosa was small-stem, such as the 161 POJ, 360 POJ, 106 POJ, Rose Bamboo, etc., but since 1924, the proportion of large-stems has been constantly increasing, as shown in this table:

Season	Small Stem %	Large Stem %
1920-21—1923-24 ...	100	—
1924-25 ...	98.78	1.22
1925-26 ...	92.49	7.51
1926-27 ...	70.45	20.55
1927-28 ...	51.18	48.82
1928-29 ...	24.08	75.92
1929-30 ...	2.00	91.56
1930-31 ...	—	98.00

Of the large-stems, Nos. 2714 POJ was the most popular until the season of 1928-29, but this year 73 per cent. is 2725 POJ. The 2727 POJ proved a failure, and in its place 2878 POJ has been introduced. The use of large-stem cane as now planted, may be analyzed, as follows:—

Area Planted to POJ.	1926-7	1927-8	1928-9	1929-30
2714 ...	6,212 "ko"	24,811	26,441	15,345
2725 ...	2,420	21,564	53,592	64,112
2727 ...	165	4,611	8,627	5,688
2878 ...	—	—	—	1,800
Total ...	8,797	51,036	88,660	86,945

Percentage of the above plantings to the total area planted:

2714 ...	70.6	48.6	29.8	17.6
2725 ...	27.5	42.2	60.4	73.7
2727 ...	1.9	9.1	9.7	6.5
2878 ...	—	—	—	2.1

It now seems probable that manufacturers will concentrate on 2725 POJ.

Large stems were first planted by the Teikoku Sugar Mfg., Co., the Niitaka Sugar Mfg., Co., and the Taiwan Sugar Mfg., Co., to be followed by the Ensuiiko, Sugar Mfg., Co., but the Dai Nihon and Meiji Sugar Mfgs., Companies were delayed in beginning their planting. This is well shown in the following figures.

PERCENTAGE OF LARGE-STEM CANE, PLANTED BY THE PRINCIPAL SUGAR MANUFACTURING COMPANIES.

Company	Year	1927-28	1928-29	1929-30
Taiwan Seito	54.9%	90.2%	97.9%
Meiji Seito	35.7	69.4	94.1
Dai Nihon Seito	36.9	62.5	85.0
Ensuiiko Seito	52.4	78.0	98.2
Niitaka Seito	60.6	77.4	93.6
Teikoku Seito	72.9	81.9	87.8

Next season, the Taiwan Seito and Ensuiiko Seito expect to plant 100 per cent. large-stems, while other companies are also expected to increase their plantings, Meimi to 95.85 per cent. of their total, Dai Nihon to 99.64 per cent. Of these large-stem canes, the greater part are 2725 POJ which in the case of Meiji comprises 84 per cent., of Ensuiiko 94 per cent., of Taiwan Seito 88 per cent., and of Dai Nihon Seito, 93.41 per cent.

Although the 2725 POJ cane is now at the height of its popularity, it is doubtful if this will continue. It is reported that this class of cane is already showing signs of deterioration, and apprehensions are now being expressed of this possibility becoming a certainty. Past history shows that any good cane is not immune from deteriora-

tion, not only in Formosa, but in other producing countries, as well. However, in Java new improved seedlings are introduced one after another, but in Formosa there has been no such continuous progress. At best, the producers in Formosa can only import new canes from Java or Hawaii in order to improve their production. The present favorite is 2725 POJ, which is imported from Java, along with all the other large-stem varieties. However the N.E.I. Government has prohibited the export of seedlings, to the great alarm of the Formosan growers. Constant efforts are being made by the "Laboratory for the Sugar Industry," as well as by every individual company, but no seedling has yet been developed which can replace 2725. The new 2878 POJ is showing excellent results in Java, but in Formosa it is still in the experimental stage, and it is not yet certain whether it can replace 2725 or not.

Another difficulty the producers encounter arises from the opening of the Kanan Daison Irrigation works. The charges for irrigation will be irksome, and although this difficulty will not be general in the industry, still it will effect Ensuiiko, Niitaka and Taiwan Seito. The Dai Nippon Seito has had its troubles with irrigation for a long time past. The difficulty the principal companies will encounter because of irrigation in the near future are shown in the following table: Area which will be irrigated by the Kanan Daison.

	Area Irrigated	Proportion of total	Proportion of area suitable for sugar
Meiji Seito ...	44,359 "ko"	44.5%	58.8%
Ensuiiko Seito ...	30,710	32.1	57.3
Dai Nihon Seito K.K....	51,300	41.3	58.9
Taiwan Seito ...	20,471	11.7	16.9
Niitaka Seito ...	11,707	24.5	49.9
Teikoku Seito ...	—	—	—

Of the seven plantations owned by Meiji Seito, five with an area of 72,000 ko will be affected, of which 44,000 ko are to be irrigated. This is 44.5 per cent. of the total owned by this company, 99,800 ko, or 58.8 per cent. of the total area it owns suitable for the growth of sugar cane.

Two plantations of Ensuiiko Seito will be affected, Shinyei and Kishinai, while Dai Nihon Seito will be affected at Kobi, and Kokuko: the Taiwan Seito at Sharokan, Wanri, and part of San-kanten, and the Niitaka Seito at Kagi.

The object of the Kanan Irrigation scheme is to make paddy fields out of the present dry lands, cane fields, and other uncultivated areas, so that the crop of rice, sugar cane, etc., may be increased. To invite such a formidable rival as rice on the cane lands will encourage a rise in the price of land, and eventually lead to a decrease in the area planted to cane, thus causing a higher price for cane. Producers will then be adversely affected in the same manner as the Teikoku Seito, whose plantations are in the center of the rice-growing district. For instance, on the Soya and Shukuryu plantations of the Meiji Seito the greater part of the area consists of ordinary fields where the only competing product is the sweet-potato. Farmers in this district are thirsty for water, to grow rice, so that when the irrigation works are opened, the first thing they will grow will be rice especially for their own food supply, and decrease the area now planted to sugar cane.

Optimists are of the opinion that this tendency will not continue for more than a few years.

The price at which cane will be bought by the manufacturers in 1930-31 is already fixed at 50 to 60 sen lower than last season, so that a like reduction in the cost of production can be expected next year. In 1921-32 the increased production of rice as a result of this irrigation will put a rapid end to schemes for lowering the cost of sugar cane to the makers. The companies which will be principally affected by this condition will be those that buy cane, from the farmers.

Cost of Sugar Production

Costs of production are likely to decrease this year, and also again in 1930-31, as the price of sugar cane has been lowered, and the tendency at present is for all commodity prices to decline. The very lowest cost of production in 1929-30 is estimated at Y.8.70 to Y.8.80 per picul. Cost next season is expected to show further decrease to as low of Y.8.30 to Y.8.40 and to less than Y.10 at the highest.

(Continued on page 638).

Far Eastern Waterworks—III

Aratama Waterworks, Tokyo-Fu

THE Aratama Waterworks has been designed to supply the North-Western suburbs of Tokyo; Yoyohata, Yodobashi, South Okubo, Yotsuya-ku, Ushigome-ku, Koishikawa-ku and West Hongo-ku, covering an area of 2,723 sq. miles embracing the towns of Nakano, Nokata, Wadabori, Suginami, Ochiai, Itabashi and Nishi-sugamo. The population of this district at the end of 1923 was 417,770, which is estimated to increase to 913,850 by the end of 1936 and 1,160,535 in 1950.

The waterworks has been primarily designed to supply 600,000 consumers, providing for an extension to 1,200,000 by taking water from another river called the Arakawa.

The consumption of water varies not only according to the season but also upon geological conditions, being greater in summer and less in winter. The daily average water supply per capita in summer has been assumed to be five cub. shaku, including requirements for fire extinguishing, industrial plants, etc. The total cost of the plant is Yen 17,200,000 of which, Yen 343,500 was borne by the Tokyo Prefectural Office and the Imperial Japanese Government. Construction was started in April, 1925, and is scheduled to be completed in September, 1931.

Water Source

The water is taken from the Tama River at Kinutamura, Tokyo-fu, at a point lower than the intake of the Tokyo Municipal Waterworks but a little higher than that for the Shibuya Waterworks.

Two lines of reinforced concrete pipe of 3.5 shuku int. dia. and about 770 m. in length, are laid in a slope of 1/1000 from the river to the collecting well arranged for the water cleaning plant. The pipes, extending into the river for 150 m., are laid at a depth of about 20 ft.

To facilitate water collection, the pipes are perforated. Another in-take pipe of about 300 m. length is laid in parallel outside of the river bank; this piping is also connected to the same well for collecting underground water and passing the latter through layers of sand and gravel. At the end of the latter pipe, a manhole of 5 by 5 by 31.5 ft. is provided for.

Water Cleaning Plant

GENERAL ARRANGEMENTS.—The plant, of about 30,970 *tsubo* area, situated near the bank of the Tamagawa, 130 m. from the intake post, includes filtering ponds, cleaning beds, high and low lift pumping houses, etc.

The water collected from the bottom of the river, enters into the suction well below the lowlift centrifugal pumps through an

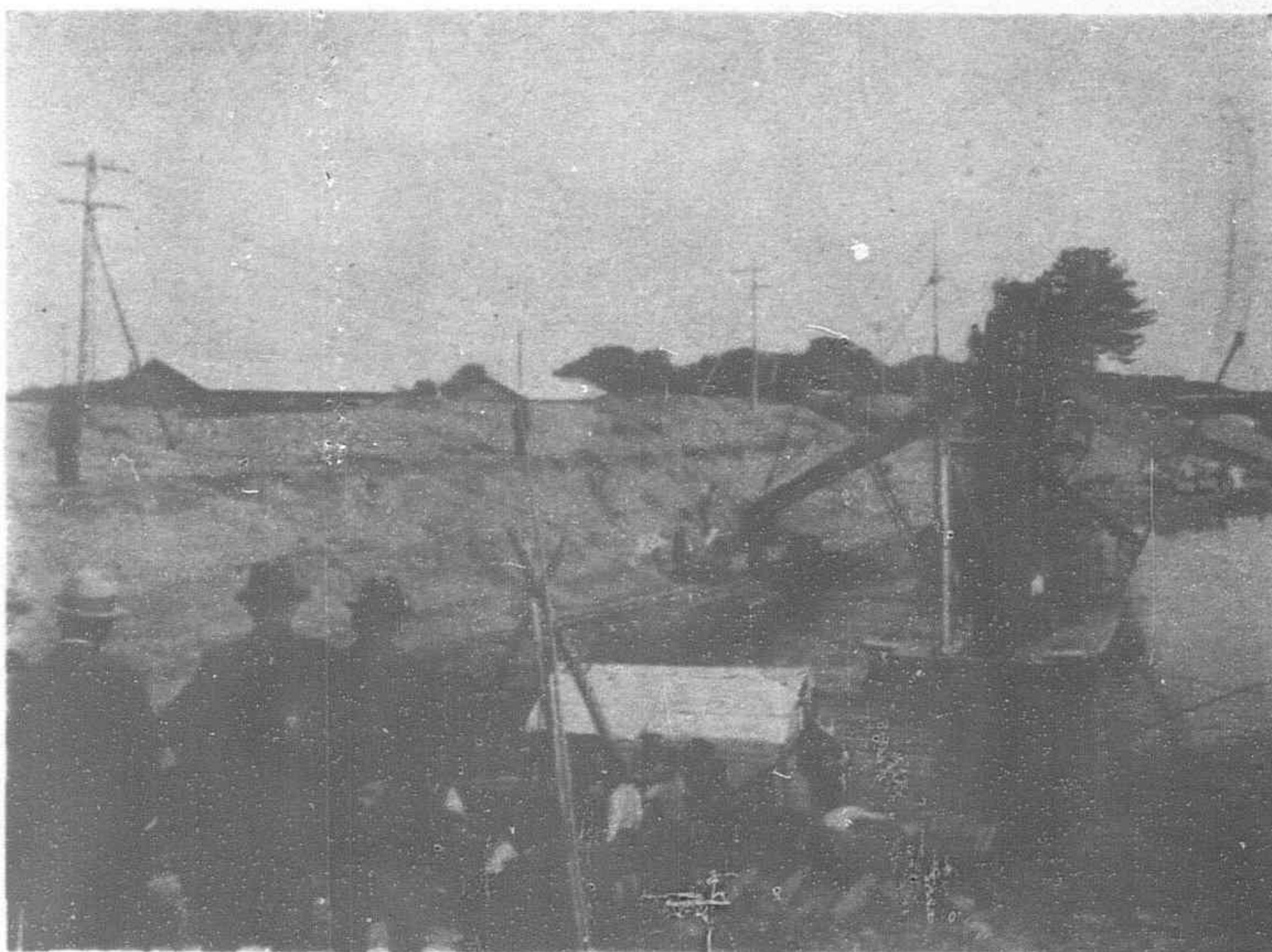
under-ground canal, whence it is pumped up into the water separating well and thence conducted into the filtering ponds where after having been thoroughly filtered at a speed of 20 ft. per day (24 hours), the water is absolutely purified from fine floating substances and bacteria. The water is then led into the cleaning bed, passing through a water measuring pond, regulating the quantity by means of venturi meters. It then enters the suction well for the highlift centrifugal pumps, which raises the water up into the water towers near Nokata and Dai-yaguchi (situated at an altitude of about 75 ft.) through outgoing mains of about 17,150 m. lengths, from whence it is distributed by gravity, for consumption. The main arrangements of this plant are as follows:—

CONNECTING WELL.—A well of 22 by 12 by 30.7 ft. is constructed of concrete and covered with sheet steel; between this well and the suction well for the lowlift centrifugal pumps, there

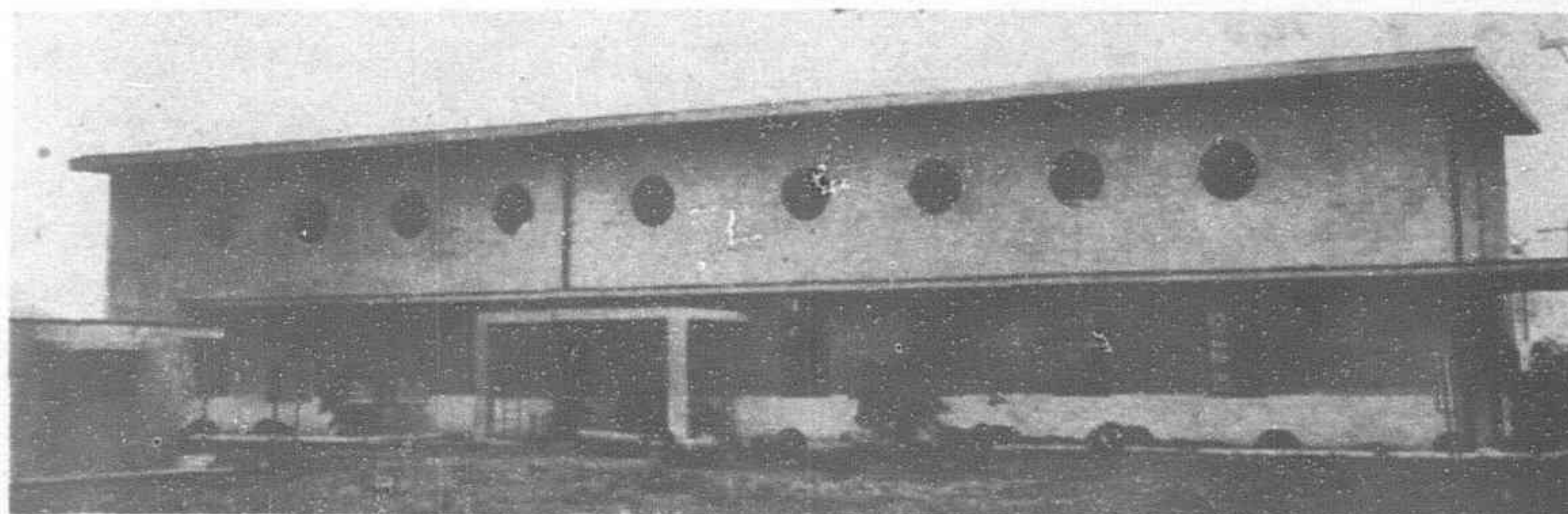
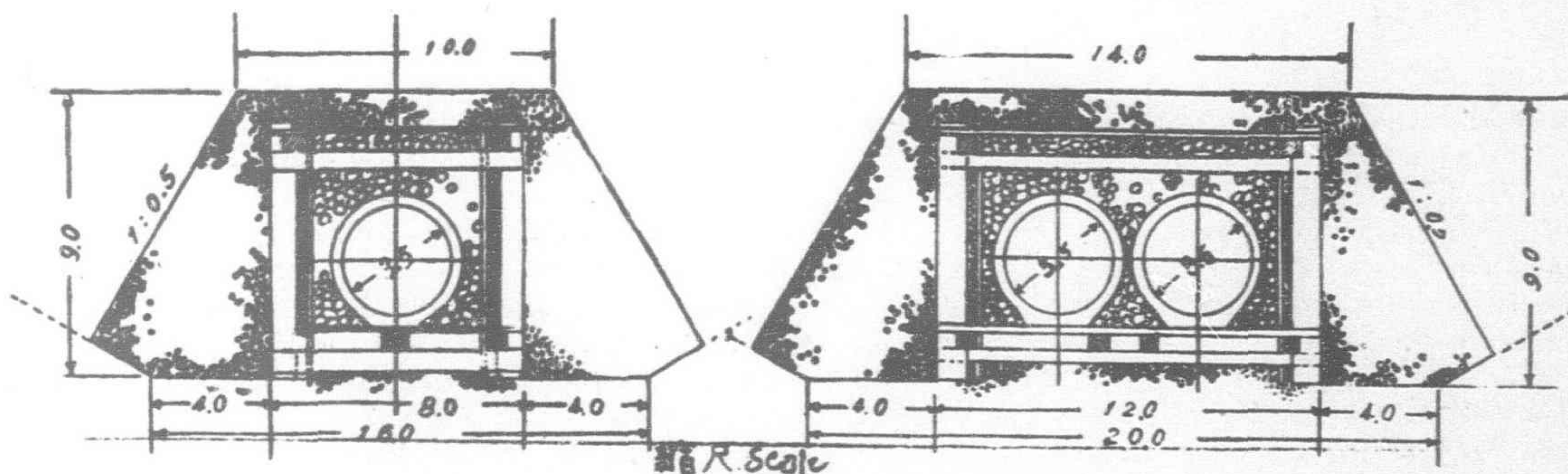
are two lines of reinforced concrete pipe of 3.5 ft. internal diameter each of about 45 m. length. Sluice gates are arranged at the inlet and outlet of the connecting well for regulating the quantity.

In case the Tama River is in flood or its main stream muddy, the two in-take pipes are closed and the water is collected by means of the inside pipe only.

LOWLIFT PUMPING HOUSE.—The reinforced concrete lowlift pumping house of 42 ft. by 78 ft., is divided into the pumping room, electrical distribution room, business office, workshop, etc. The foundations of the pumps and electric motors, directly coupled to each other, are on reinforced concrete arches covering the two underground suction wells, each of 6 ft. by 63 ft. 5 in. The water



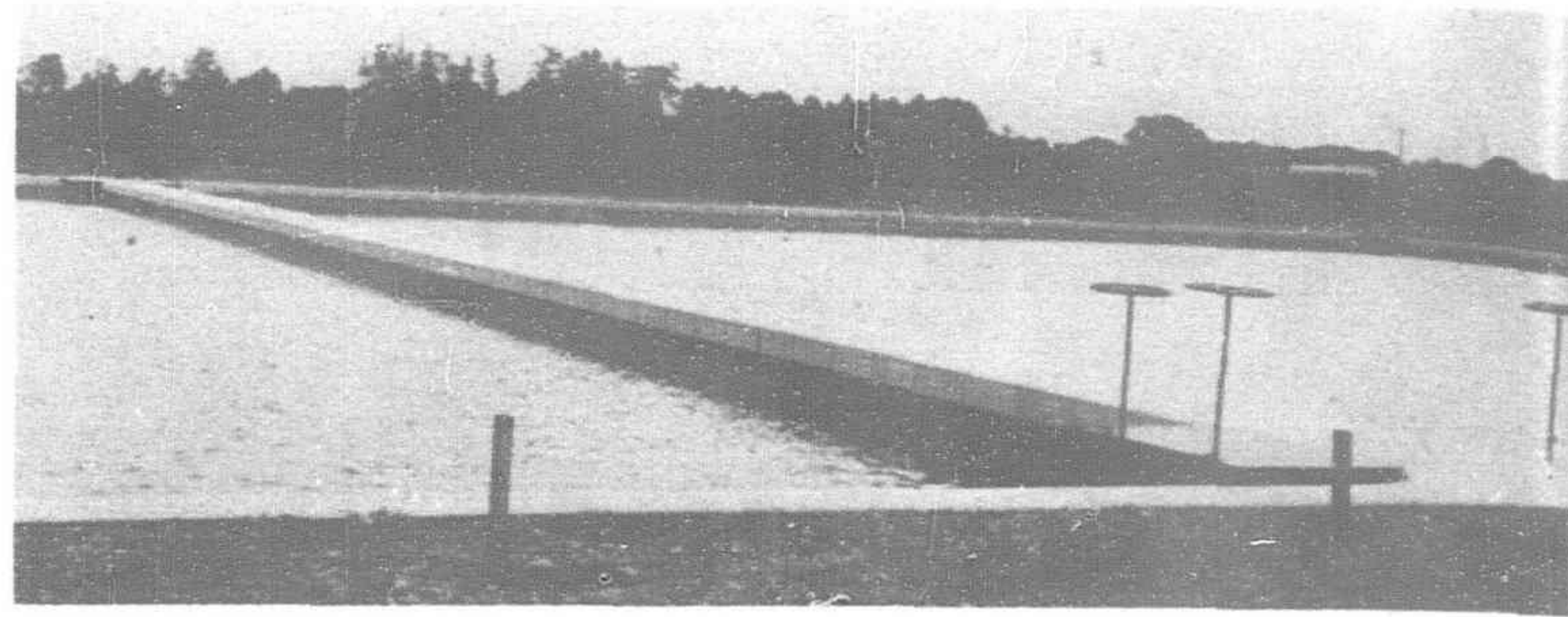
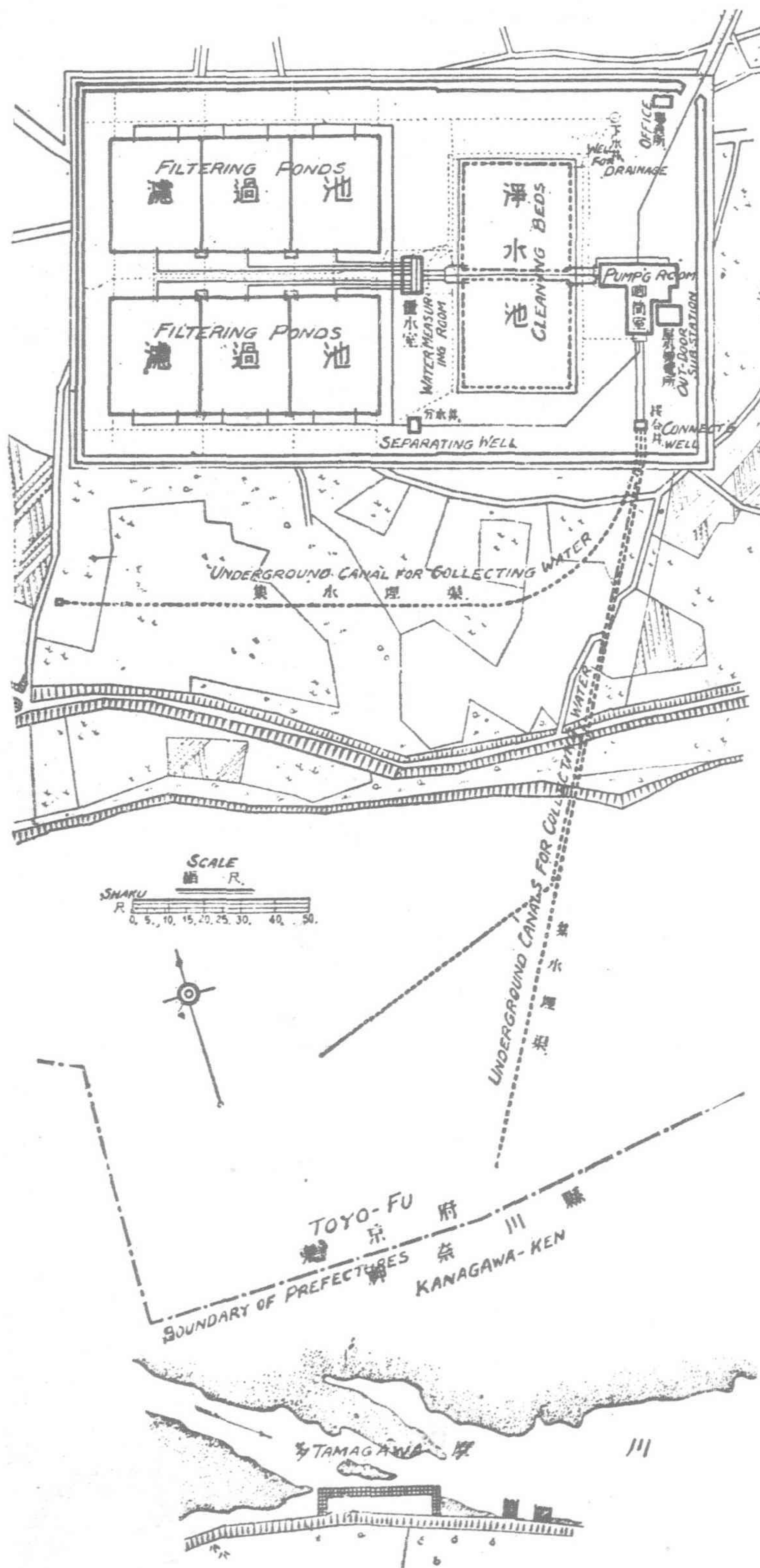
Laying Collecting Pipes at Intake



Pumping House for Aratama Waterworks

ARATAMA WATERWORKS

Water Source and Water Cleaning Plant



Completed Filtering Ponds, 200-ft. by 150-ft. by 10-ft.: Filtering Speed 20 Shaku Day

own suction well. When any of the filtering ponds are to be repaired or cleaned, the other pump group is able to pump up 60 per cent. of the total quantity. The required quantity to be supplied and number of pump sets to be operated during 1928/1936 are as follows:

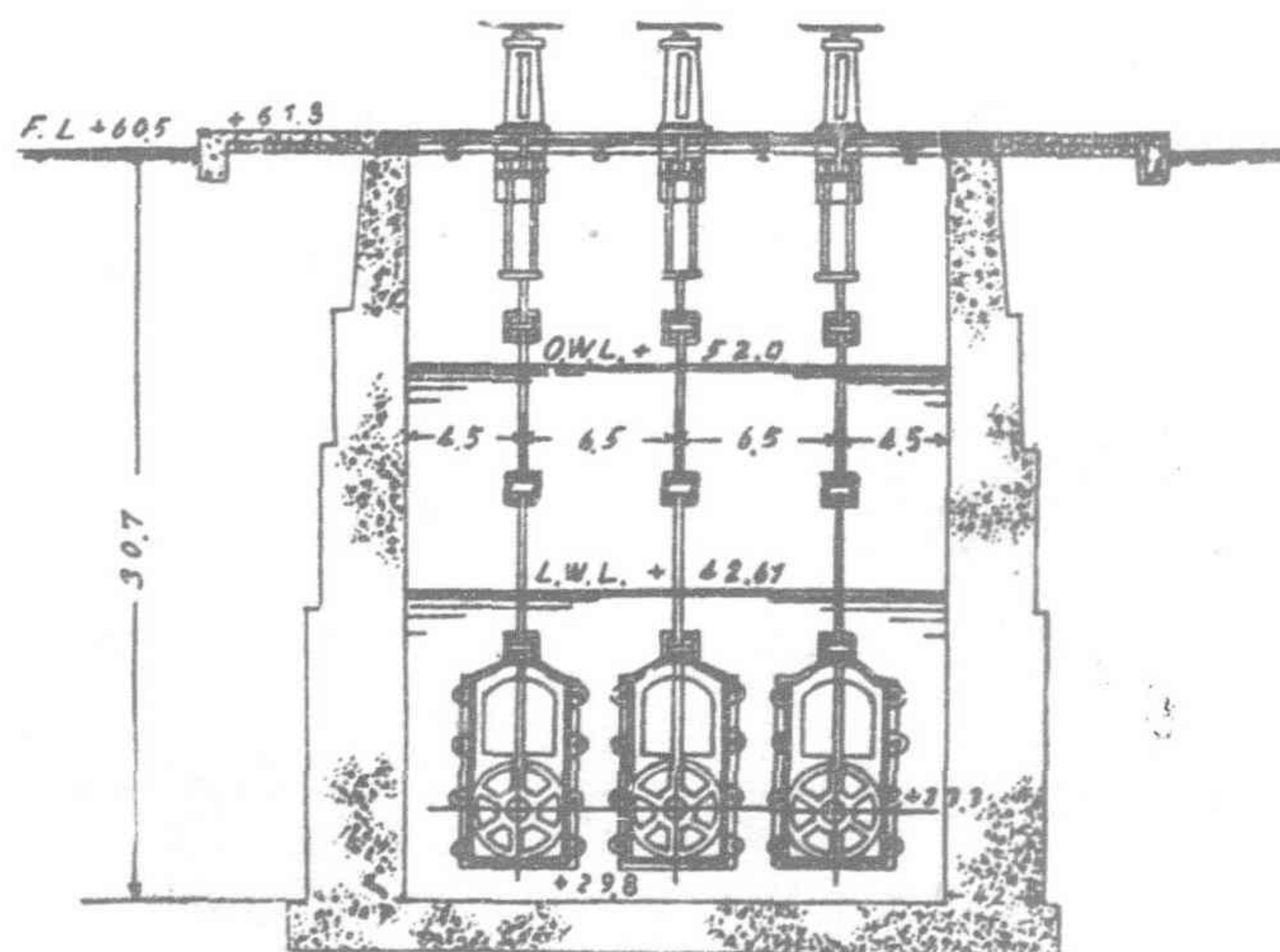
TABLE NO. 1 REQUIRED PUMP SETS TO BE OPERATED AND CORRESPONDING OUT-GOING WATER QUANTITY

Year	Expected population	Req'd water q'ty (cub. shaku/sec.)	No. of pump set to be operated	Req'd q'ty to be delv'd. (cub. shaku sec.)	Note.
1928	89,345	6.21	1	8.4	Surplus water against required quantity is regulated by means of shortening the running time or charging the water into water towers.
1929	193,311	13.42	2	16.8	
1930	276,791	19.23	3	25.2	
1931	331,978	23.08	3	25.2	
1932	370,876	25.78	4	33.6	
1933	412,661	28.68	4	33.6	
1934	465,943	32.62	4	33.6	
1935	531,650	37.21	5	42.0	
1936	600,000	42.00	5	42.0	

WELL FOR SEPARATING WATER.—Raw water raised by the lowlift pumps is conducted by means of iron pipes of 900 mm. int. dia. to a concrete well of 24 ft. by 18 ft. by 12 ft. Two pipe lines of reinforced concrete, open into the filtering ponds on the north and south side by means of pipe branches of 450 m/m dia. provided with sluice valves.

FILTERING PONDS.—Six ponds each of 200 ft. by 150 ft. by 20 ft. capacity, are grouped in two sections, each consisting of three ponds, connecting with each other. The effective filtering area of each pond is 30,000 sq. ft. with a filtering speed of 20 ft. per day of 24 hours. It is possible to obtain 600,000 cub. ft. of filtered water per day per pond and consequently the maximum water quantity for 600,000 peoples pre day can be filtered by five ponds, keeping one as spare.

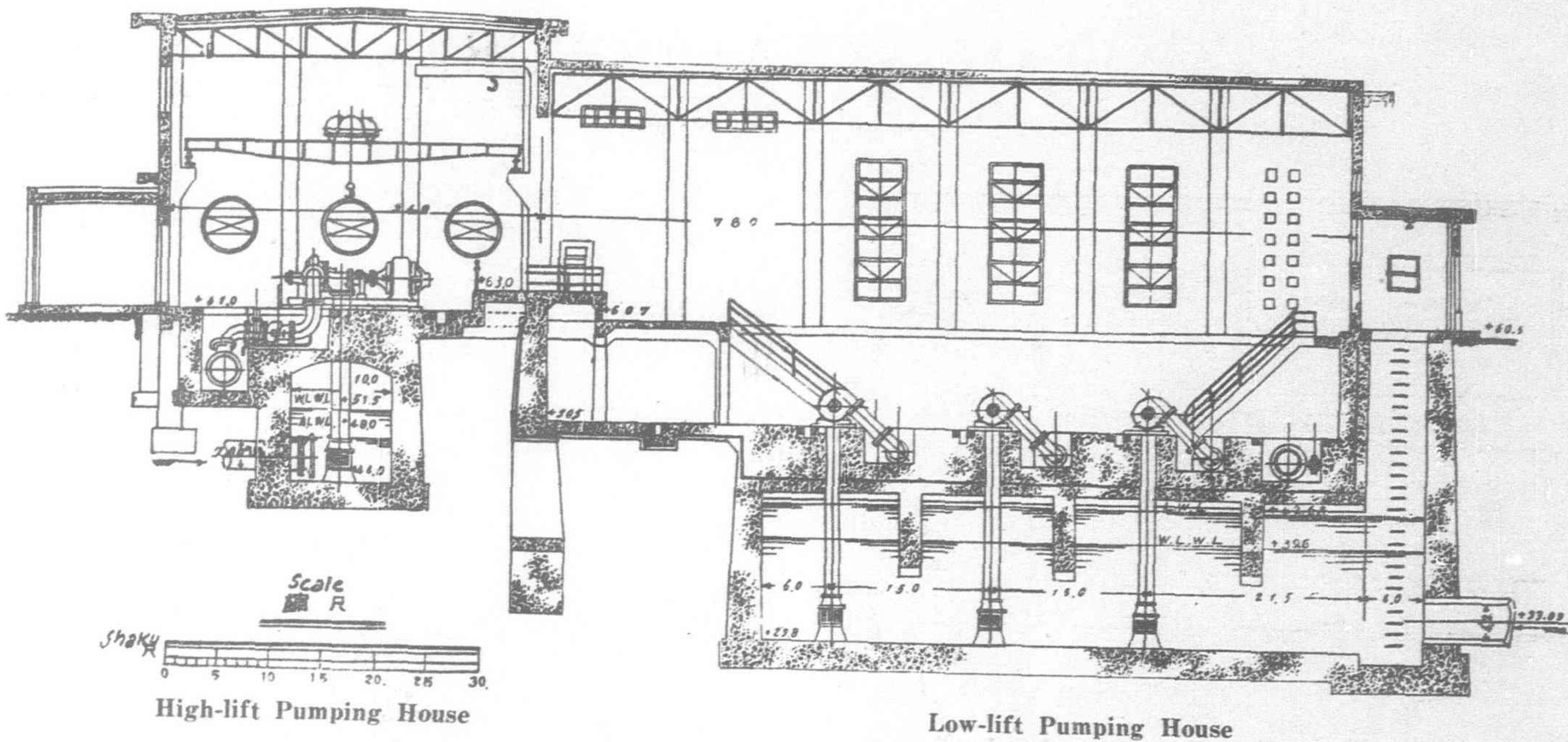
CHAMBER FOR WATER MEASURING APPARATUS.—In a reinforced concrete chamber of about 14 m. by 10 m. the water measuring apparatus is installed underground. The clean water conducted to this chamber from the filtering beds passes through three different pipes of 450 m/m 500 m/m, 600 m/m int. dia. respectively.



Connecting Well

level of the suction well depends upon the river level; its lowest being about 12 ft. 8 in. In order to facilitate internal inspection, cleaning, etc., man-holes are provided for the suction wells and their surrounding walls and bottoms are covered with asphalt for preventing the penetration of flood and underground water.

The lowlift pumps deliver the raw water into the filtering ponds. As already explained, the primary object of the plant is to supply water for 600,000 consumers, adding a margin of 20 per cent. for loss and miscellaneous use, calling for 42 cub. shaku sec. Six Sulzer centrifugal pumps with nozzles of 275 mm. dia. capable of raising 8.4. cub. shaku sec. have been installed; five being sufficient for the above purpose, the remaining one kept as spare. The six pumps are grouped in two sets, each set provided with its



The water quantity is automatically measured by means of venturi meters and the filtering speed regulated by sluice valves.

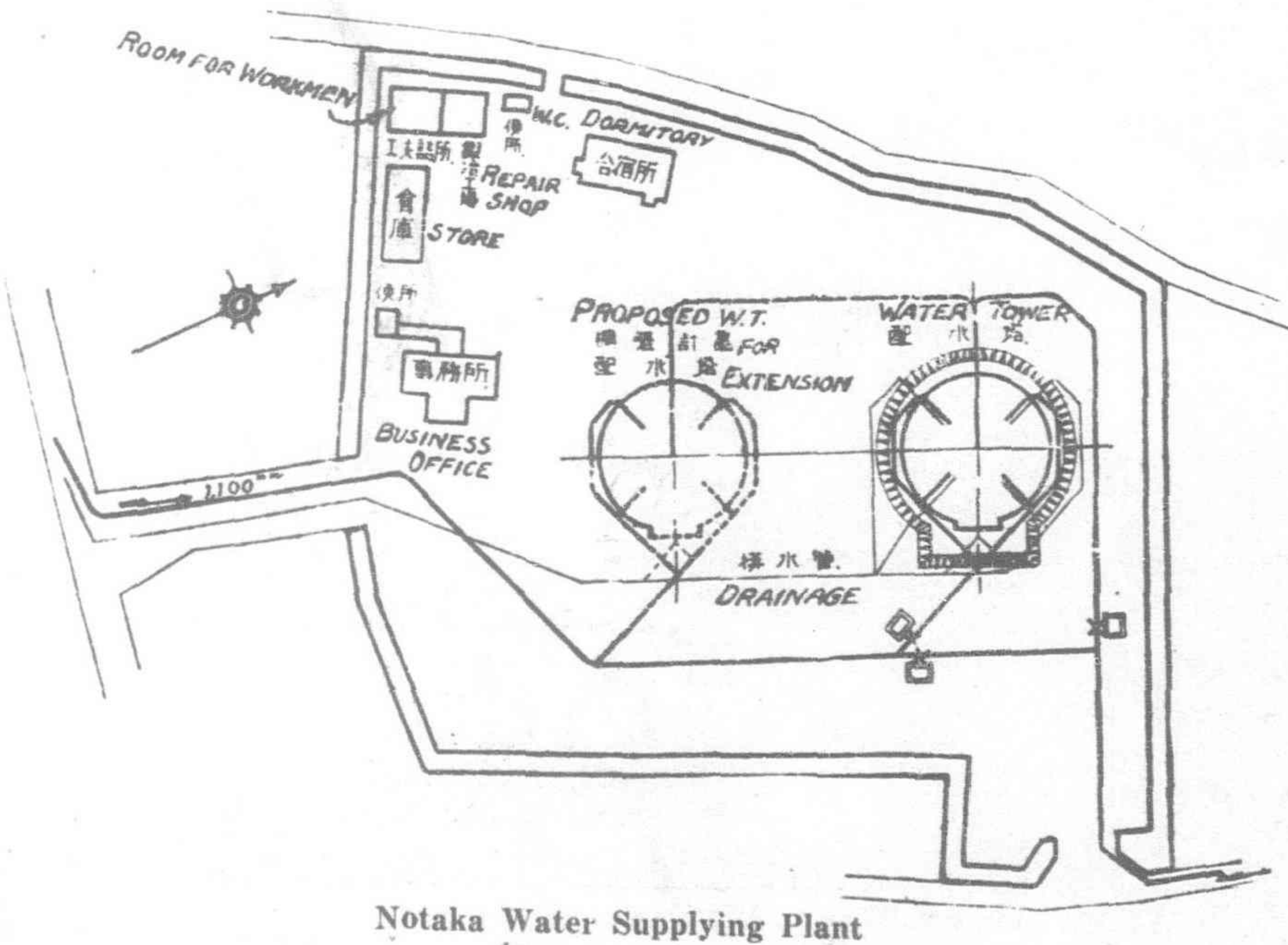
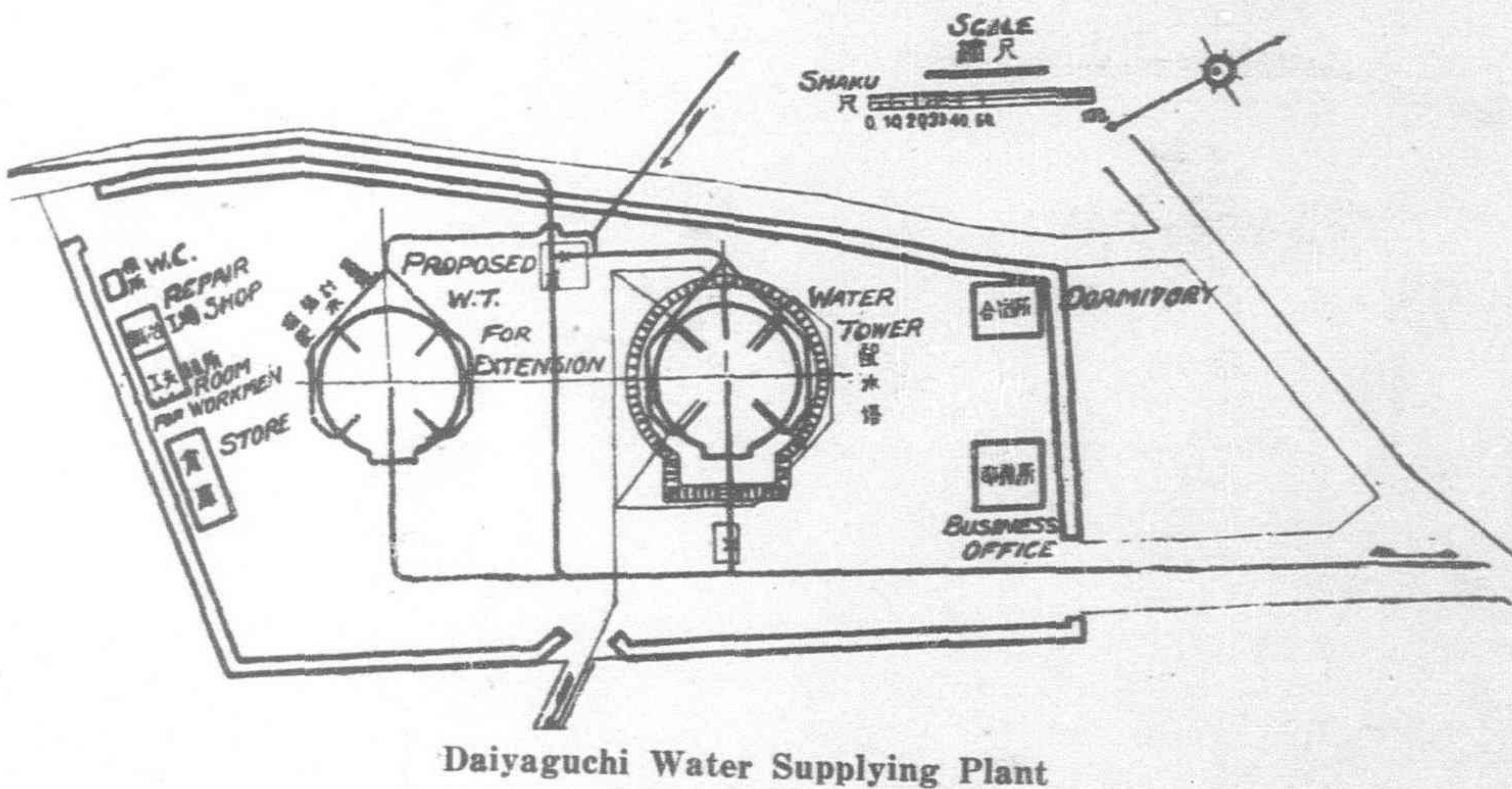
CLEANING BEDS.—Two concrete cleaning beds each of 180 ft by 8 ft. and each of a capacity of 245,000 cub. ft., are capable of storing the necessary water for four hours in case the required water supply amounts to 3,000,000 cub. ft. per day.

HIGHLIFT PUMPING HOUSE.—The highlift reinforced concrete pump house of 40 m. by 11 m. is arranged in contact with that for the lowlift pumps. The building is divided into a pumping room and electric distributing room, with a special room of 22 *tsubo* for the electrical receiving apparatus.

Two suction wells each of 10 ft. by 54 ft. by 12 ft. are located under ground. Between them, space is left for a sluice valve built into the connection between the two wells for draining purposes. The pump sets rest on concrete arches just above the suction wells. In order to control the flow from the filtering beds, a special chamber alongside the suction well is equipped with regulating valves.

The highlift pumps deliver clean water to the cleaning beds and into the water towers and partly also directly to the towns. Six sets of 2-stage Sulzer centrifugal pumps with guide vanes of

350 mm. nozzle diameter have been provided for, one set serving as a spare. The six pumps grouped into two sets of three pumps each, taking water from a common well, are capable of delivering 60 per cent. of the total water quantity required, in case the one or other well needs cleaning or repairing.



As already assumed, the water supply per head and per day amounts to about 5 cub. shaku, and considering a safety factor of 50 per cent., to total required quantity has been calculated at 52.5 cub. shaku/sec. The necessary supply of water and number of pumps to be operated during 1928/1936 are explained in table No. 2.

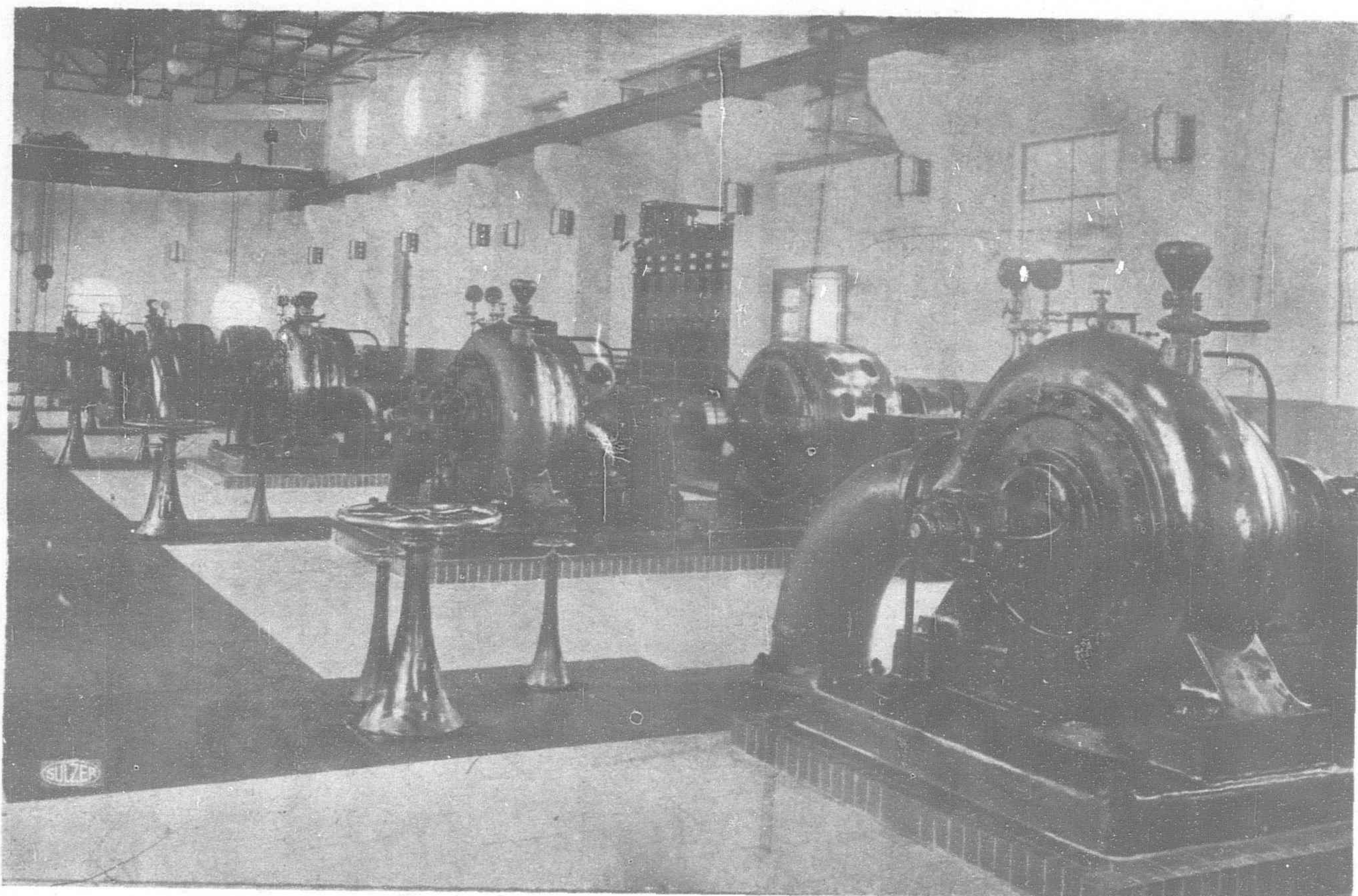
TABLE No. 2.

Year	Expected population	Required water q'ty cub. ft./sec.	No. of pumpset to be operated.	Required out going water q'ty cub. ft./sec.	Note.
1928	89.345	7.76	1	10.5	Surplus water against wanted quantity is regulated by means of shortening running time or changing the water into water towers.
1929	193.311	16.77	2	21.0	
1930	276.791	24.05	3	31.5	
1931	331.978	28.84	3	31.5	
1932	370.876	32.20	4	42.0	
1933	412.661	35.85	4	42.0	
1934	465.943	40.77	4	42.0	
1935	531.650	46.52	5	25.5	
1936	600.000	52.50	5	52.5	

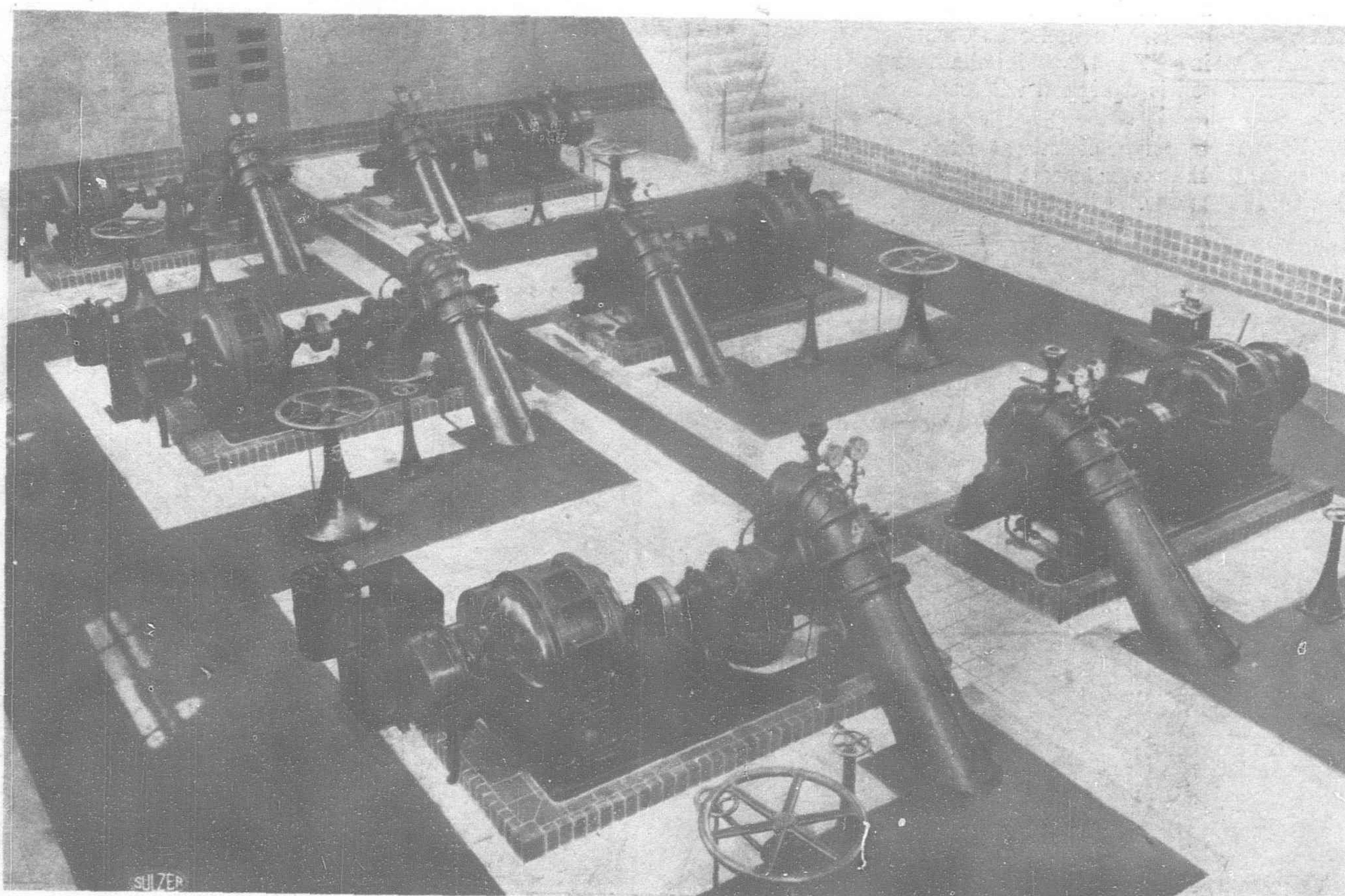
The maximum suction head of the pumps is in 56 ft. and 51.5 in. minimum. The effective head

ARATAMA WATERWORKS

TOKYO, JAPAN

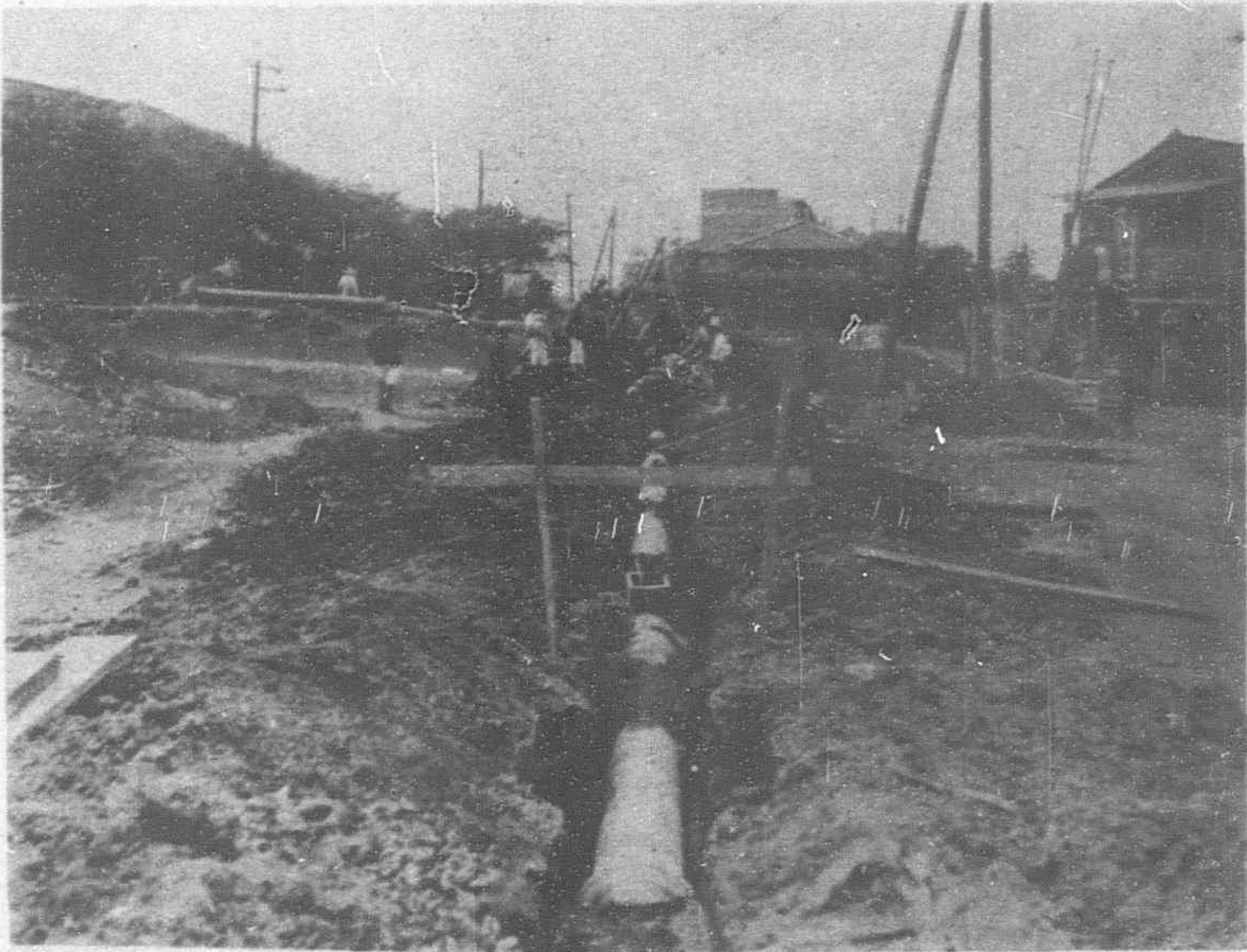
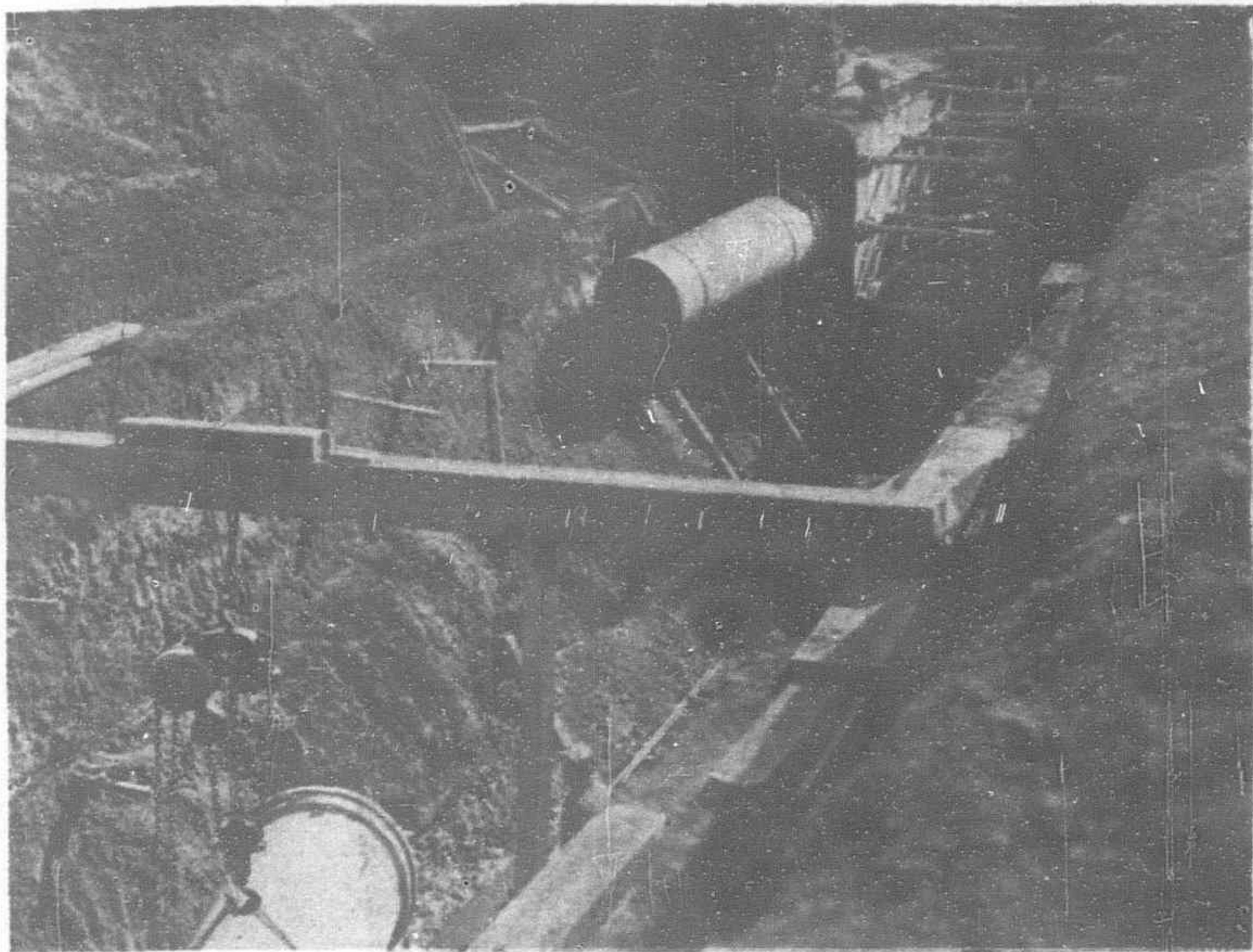


High-Lift End: 6 Sulzer Turbine Pumps, each of 350 m.m. Nozzle Diameter and 450 h.p.

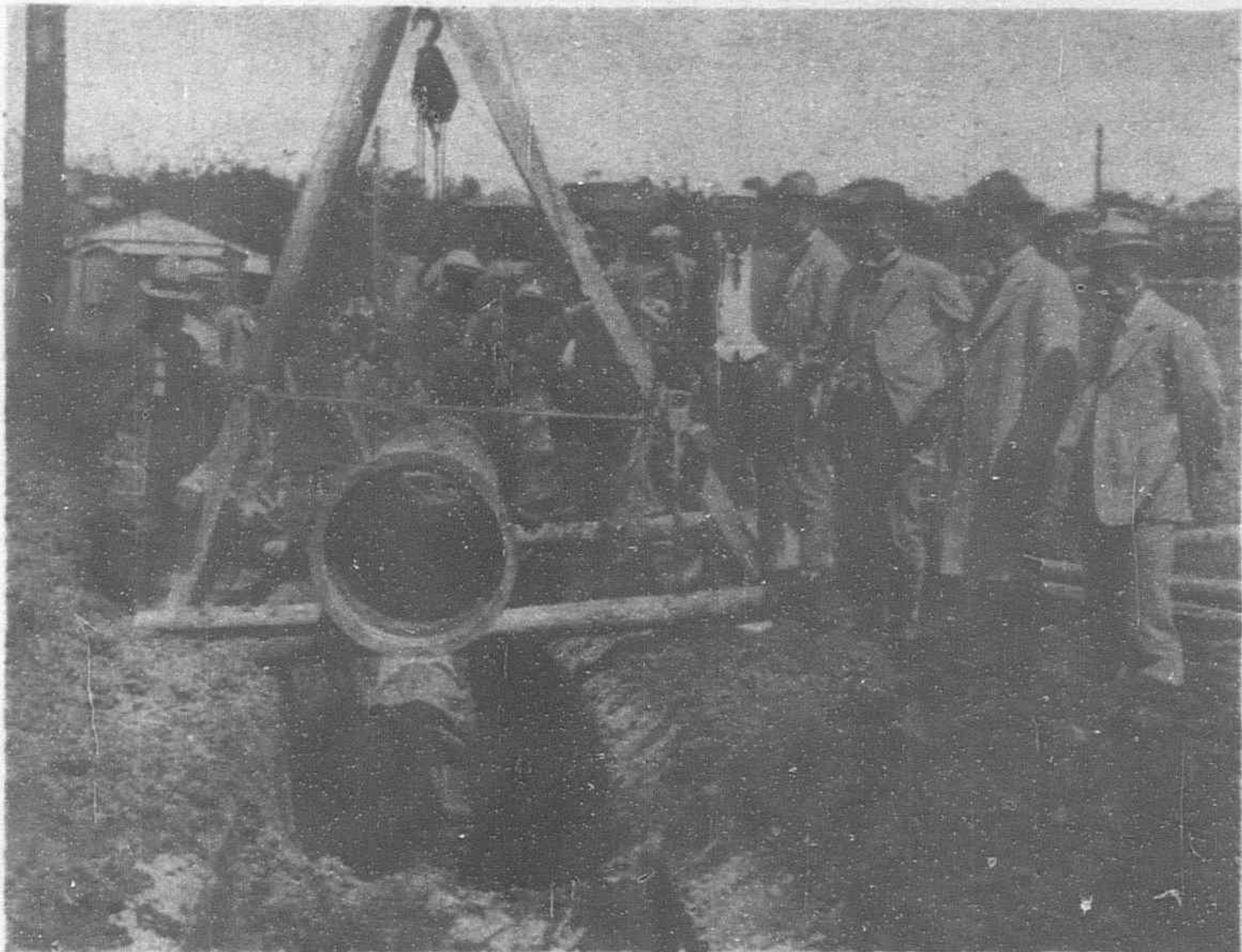
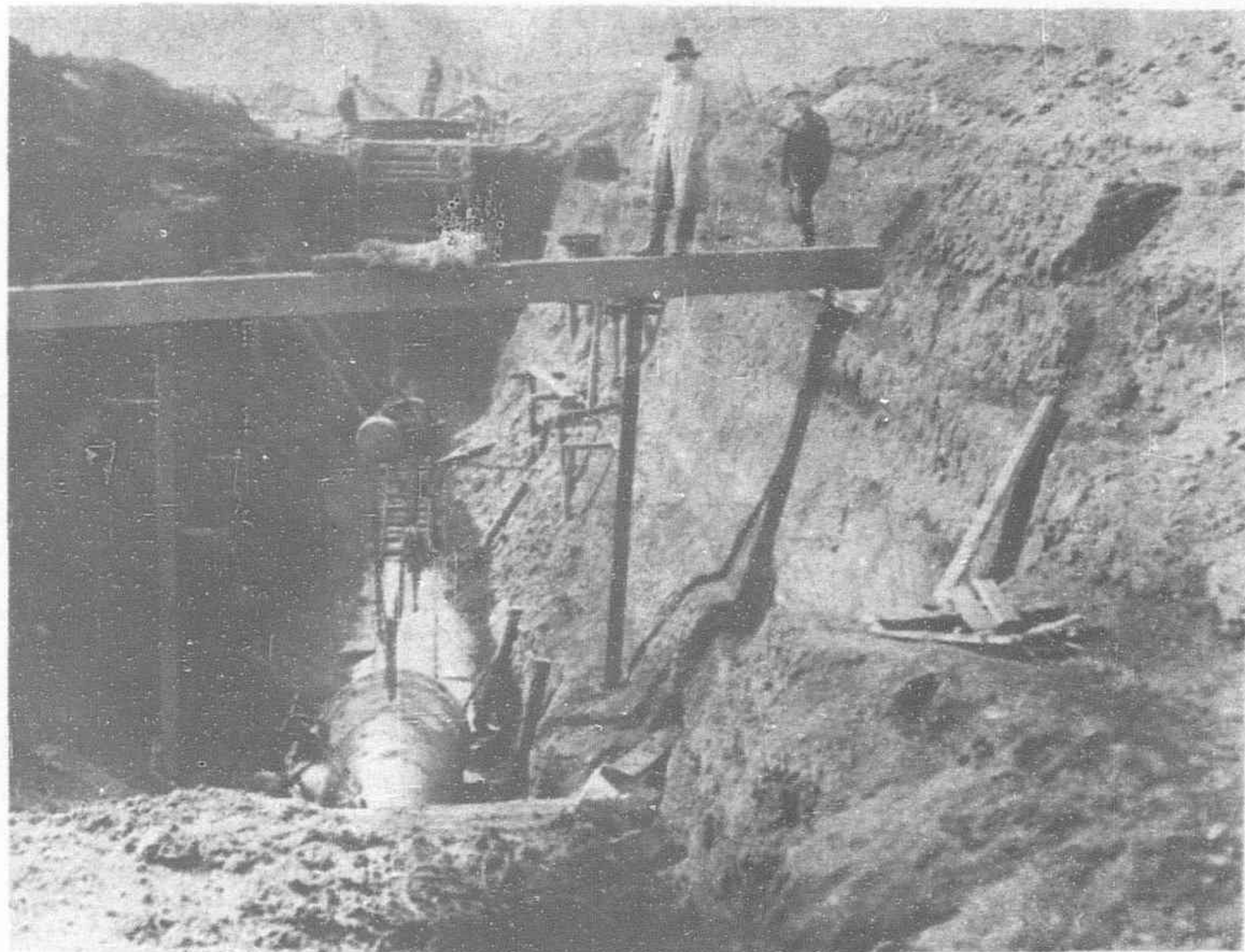


Low-Lift End: 6 Sulzer Centrifugal Pumps each of 275 m.m. Diameter and 50 h.p.

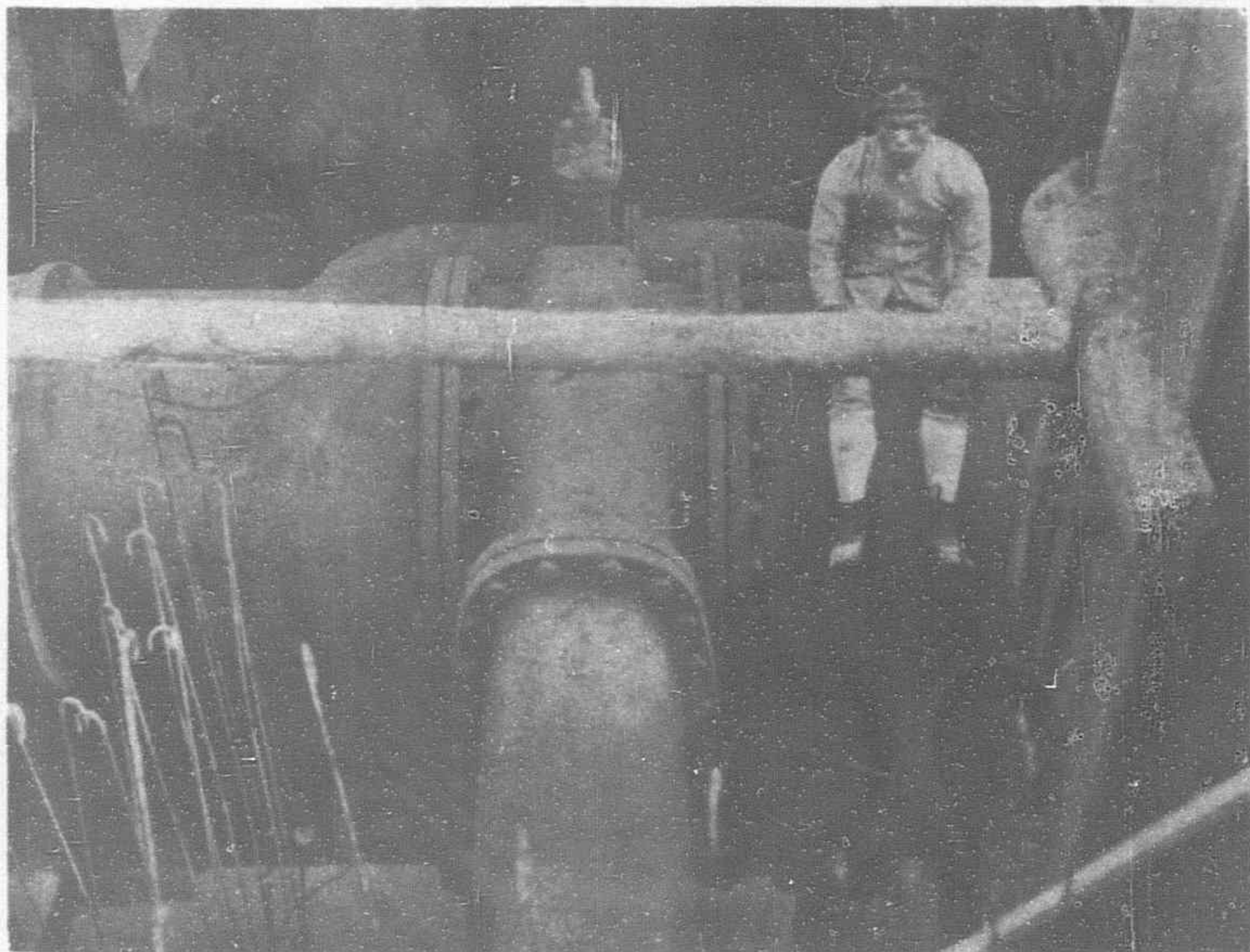
PIPE LAYING



Laying Water Mains



Laying Outgoing Mains of 1,100 m.m. Diameter



Constructing Room for Sluice Valve for 1,100 m.m. Mains

Laying Outgoing Mains

of water towers is about 190 ft. at lowest level and 200 ft. at maximum level and consequently the statical head works out 134 ft.-148 ft. 5 in.

The water is distributed through 8 mains. The percentage of water quantity to be transmitted by the mains, varies from 2,293 to 14,088 per cent. against the total water quantity.

Main Out-going Piping

The out-going mains of 1,100 mm. int. dia. run eastwards from the water cleaning plant to the Nokata water supplying post, thence to a similar one located at Daiyaguchi. The piping is laid at a depth of 4 ft. or lower below road levels. Necessary protection is provided where the piping crosses railways or water lines, while at other points reinforced foundations are laid.

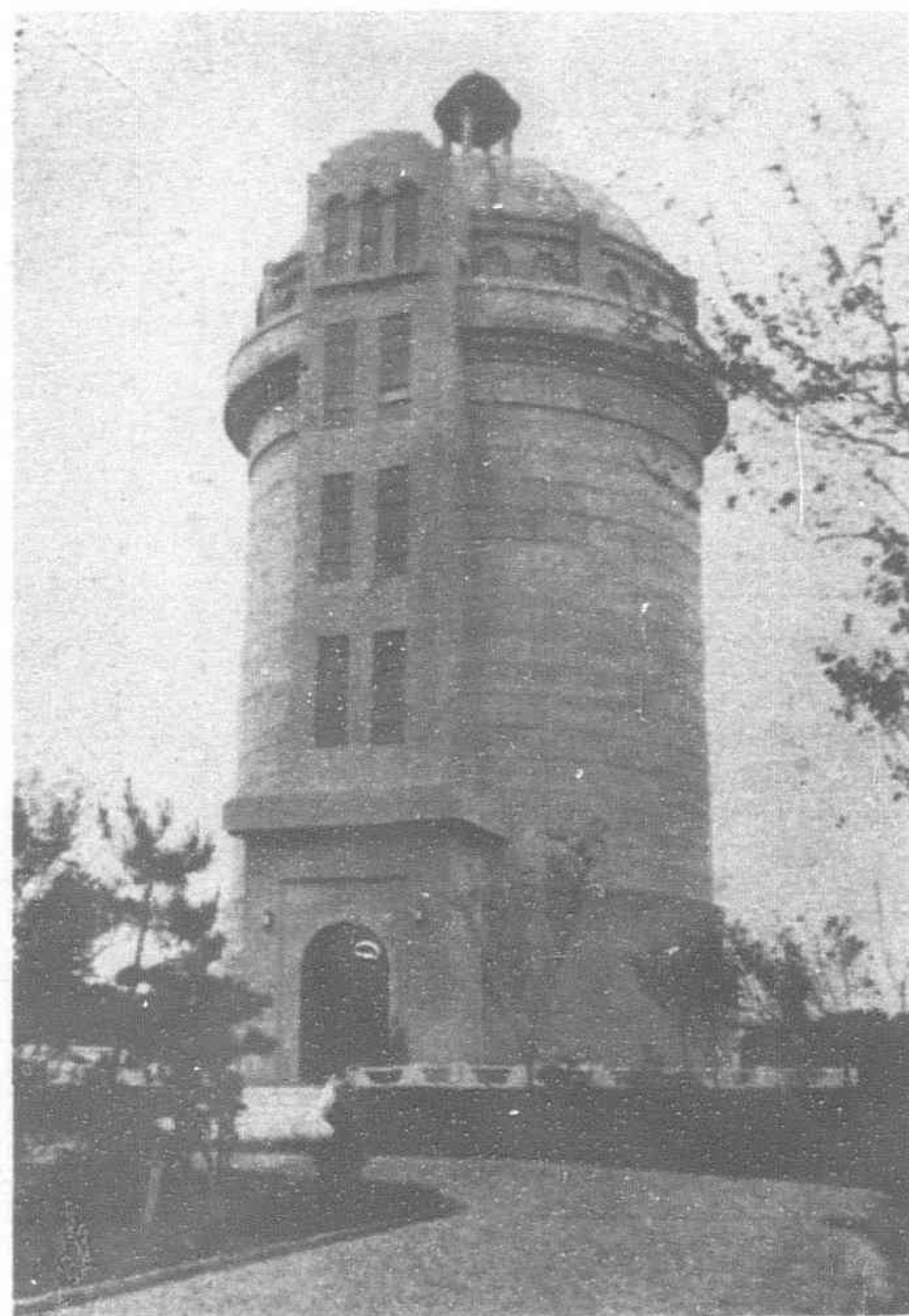
Sluice, air and mud valves, venturi meters of 1,100 mm. dia. as well as Johnson valves are arranged at important or necessary positions.

The total length of the mains is about 17,140 m.

Water Supplying Posts

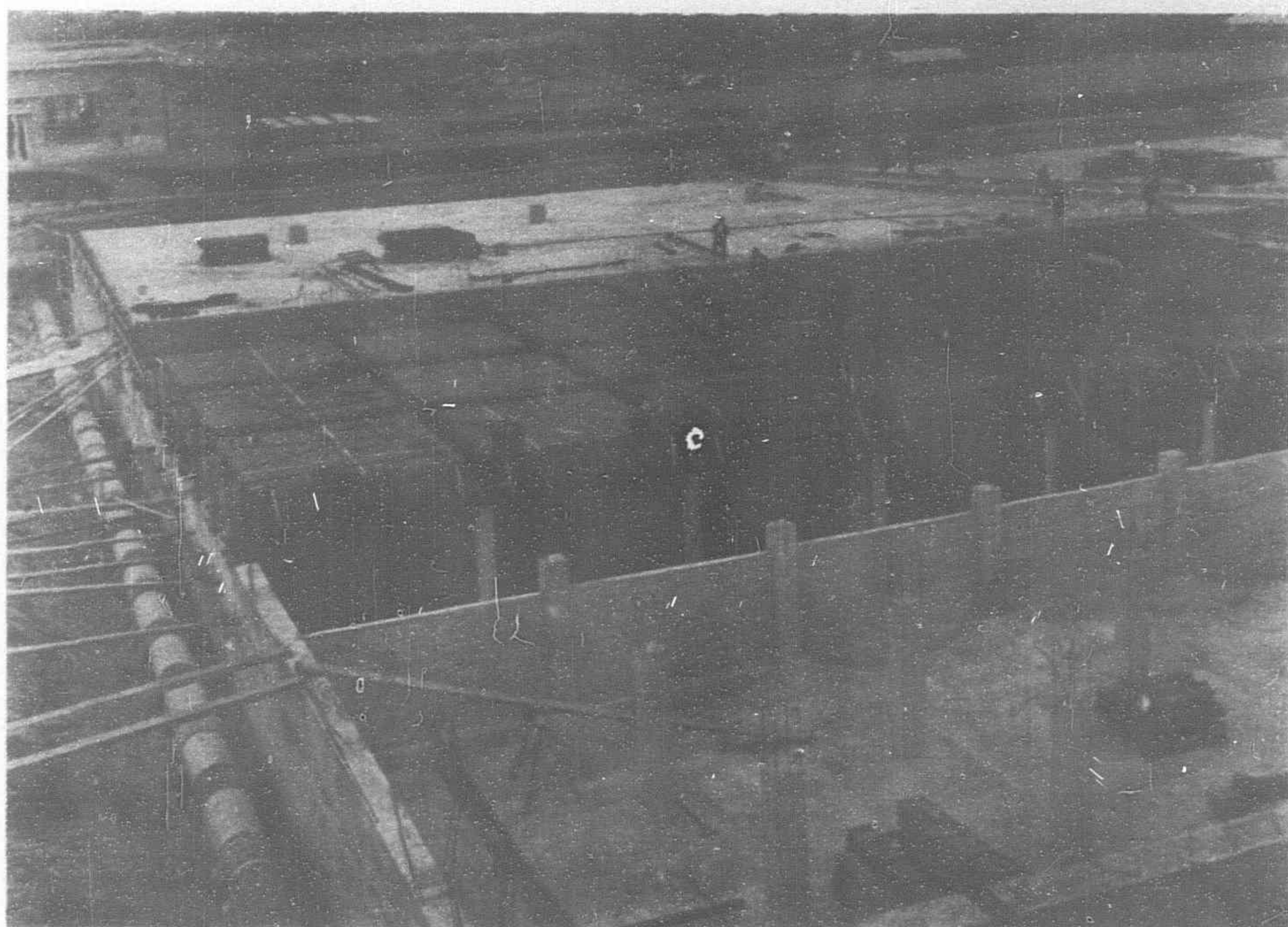
The water supplying posts are located at Nokata and Daiyaguchi. Each post has one water tower with ample space for extension. The towers are constructed of reinforced concrete of 45 ft. int. dia., and a total height above ground of 102-105 ft., each with an effective capacity of 100,000 cub. ft. The two towers are able to store the necessary water supply for 600,000 people during two hours under an average consumption.

Each tank has a depth of 72 ft. The thickness of the surrounding wall being 1.5 ft. at the upper end and gradually increasing in thickness downwards. The cover of the vessels is of 3 ft. thickness in the center and in other parts of 5 ft. In order to prevent leakage, a steel sheet of 3 mm. thickness covers the inside of the tank, the joints of which are electrically welded, and further covered with a concrete iron net of 90 mm. The out-going main of 1,100 mm. dia. is divided into two branches each of 800 mm. dia.; and subdivided again into four pipes arranged around the foundation. Vertical steel pipes



Nokata Water Tower

Completed

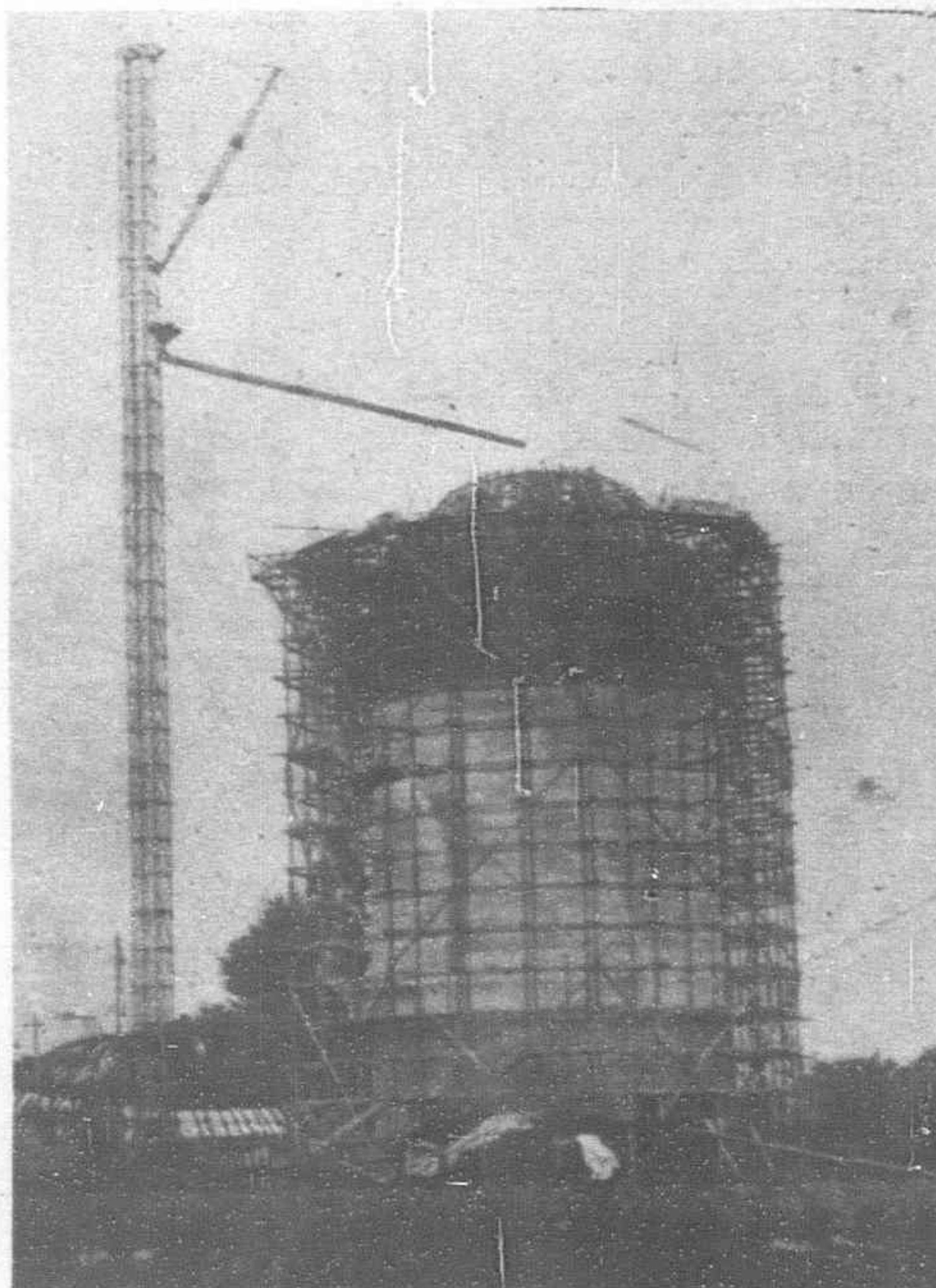


Cleaning Beds in Course of Construction

erected symmetrically along the walls conduct the water into the tanks. The distributing main of 900 mm. int. dia. ends in the centre of the water tank at a height of 3 ft. above the bottom. The reinforced concrete foundation of the towers rests on piling. A water meter attached to each water tank, signals automatically to the office any excess in increase or decrease in the supply of water by means of electric bells.

Clean water is conducted to the Nokata Water tower by means of an out-going main of 1,100 mm. dia. supplying at the same time a small quantity of water to the other towers, whence water is generally distributed by gravity. The Daiyaguchi reservoir is temporarily used for regulating purposes only. However, in case of future extension when connecting the water source with the "Arakawa" (another river), this reservoir will be put into actual service.

The direct water supply is being regulated by means of sluice valve according to necessity.



In Course of Construction

Union Oil in the Far East

The Union Oil Company of California a \$300,000,000 concern is conducting a careful investigation of the Far Eastern markets as an outlet for its products and it is reported that the prospects are deemed so favorable that it will erect a large plant in Shanghai early in 1931 and begin active marketing of its products in Central China. It is reported that the home office of the Company, located at Los Angeles, has decided to spend ten to twelve million dollars in establishing offices and plants in the Orient. With Shanghai as the central office, subsidiary plants will be established at Tientsin to serve North China, at Hongkong for South China and one at Manila for the Philippines business.

The Union Oil Company of California, incorporated in 1890, is one of the oldest oil companies in that state, and has developed many of the oil fields located in the Western United States. Until recently, the company has confined its major distribution and sales activities to the United States, confining its operations in China to marketing of greases and lubricating oils. The decision of this company to enter the Oriental market on a grand scale in competition with the older established firms, may be accepted as another sign of confidence in the rapid development of the Chinese demand for gasoline and other petroleum products.



Baron Yasushi Togo, Managing Director



Mr. Kakichi Uchida, President



Mr. Shunkichi Goto, Managing Director

Progress of Wireless Telegraphy in Japan

Activities of the Japan Wireless Telegraph Company, Ltd.

By BARON Y. TOGO

THE business of the Japan Wireless Telegraph Co., Ltd., is to set up by Government order wireless telegraphic equipments for communications between Japan and foreign lands for use by the Imperial Japanese Government, and to preserve and operate them. In other words, it is the object of the company to complete and help the international wireless communication facilities of the Government with private funds.

For this object the company was organized in October, 1925. International wireless facilities in Japan were quite primitive then, wireless communication with the United States, being the only system then in existence here. Telegraphic messages from Tokyo to San Francisco, for instance, were sent from the Tokyo Central

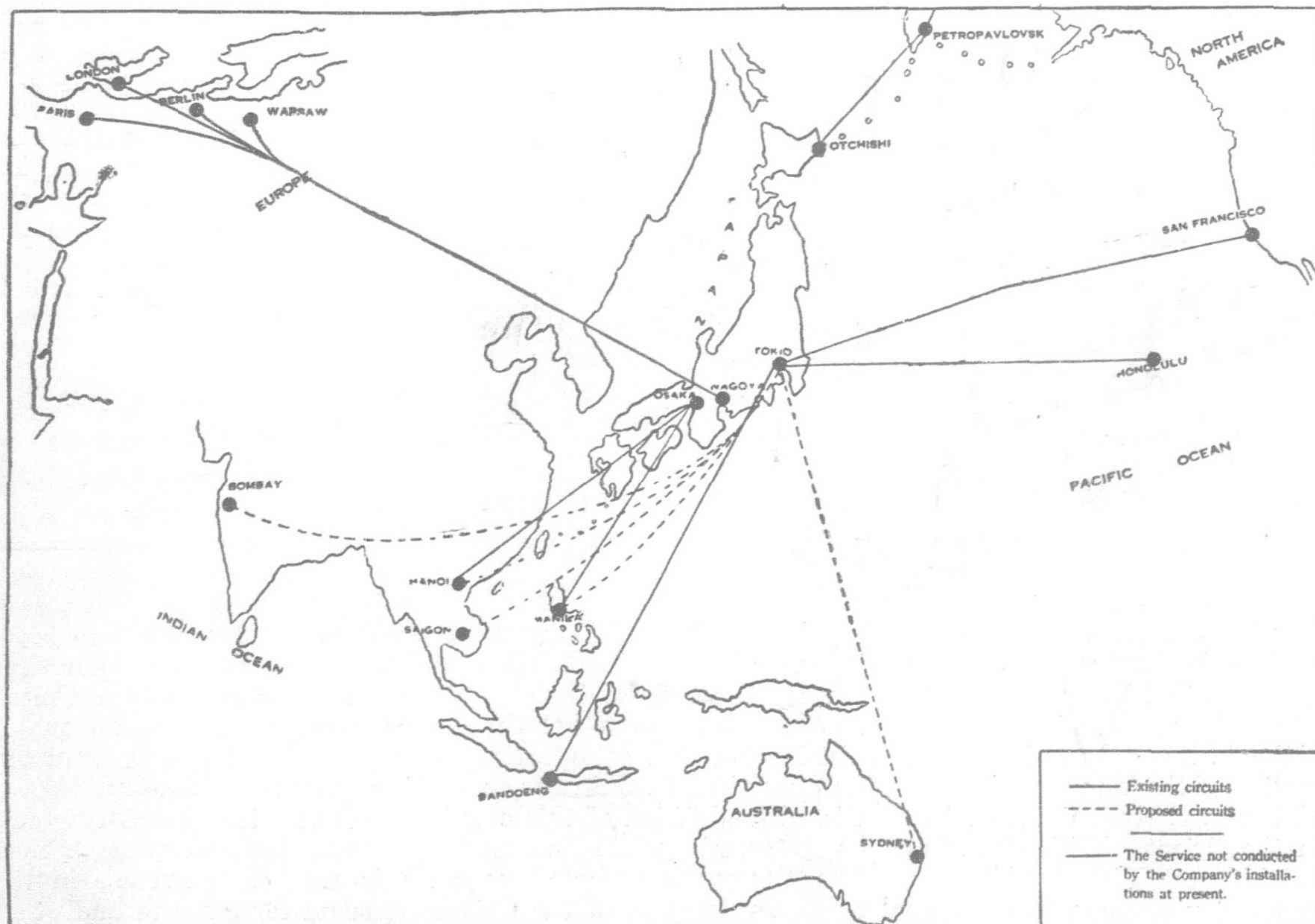
Telegraph Office to the Iwaki Station, a name collectively given to the Haranomachi Sending Station and the Tomioka Receiving Station, and then to the Honolulu Station, thence to the San Francisco Station, it being necessary to go through two relay offices before reaching America.

For all telephone services, of which accuracy and promptness are the life, nothing is more to be avoided than a relay, and it was really quite unsatisfactory that all messages from Tokyo to San Francisco had to be sent through two relay offices.

Upon the establishment of this company the Directors decided to devote their efforts to the improvement and completion of the wireless service with America. In March, 1927, a station receiving messages from America was erected in Fukuoka-mura, Saitama-ken,

operative automatically at the Tokyo Wireless Station; and at the same time the Hara-machi Sending Station was so re-equipped as to be operative automatically by the Tokyo Wireless Station. This completion of a wireless communication system of central operation dispensed with the relay service of the Iwaki Wireless Station in Japanese-American communications, both received and despatched.

There was, however, still a relay in Hawaii, necessary in communications between the two countries, which was unsatisfactory. An arrangement was concluded, therefore, between us and the American RCA Company, which possessed communicating stations; and my company introduced a great improvement in the equipment of the Harano-machi Sending Station at a cost of about Y. 1,500,000; and the American company set up newly an equipment for sending messages in their San Francisco Wireless Station, by which we could start



WORLD WIDE RADIO COMMUNICATION SYSTEM OF THE JAPAN WIRELESS TELEGRAPH COMPANY, LTD.

JUNE, 1930.

communications directly between Tokyo and San Francisco on September 1, 1928, eliminating relay at Honolulu.

To-day wireless messages are exchanged without relay between Japan and the American Continent over a distance of about 4,000 nautical miles of the Pacific, and although there is a pretty good number of such messages, yet we can handle them between Tokyo and San Francisco at an average time of about 20 minutes; and between Tokyo and New York at that of about 40 minutes, both sending and receiving.

Besides, my company in appreciation of the characteristic features of wireless messages by short wave-length, which has made remarkable progress of late, has set up an equipment for sending messages to America at Tomioka, Fukushima-ken, which is now in operation. This equipment, like the Harano-machi Sending Station, is operated at the Tokyo Wireless Station for sending messages direct to the San Francisco Wireless Station. They are sent at the high speed of 100 words per minute.

The next thing to be accomplished by my company was the setting up of an equipment for direct exchange of messages between Japan and Europe. For this purpose, we completed a station receiving European messages to be operated at the Nagoya Station at Yokkaichi, Miye-ken in March, 1928; and in September the same year it started receiving messages direct from Berlin, Paris and Warsaw; and early in 1929 we brought to completion the building of a station sending messages to Europe, which had been going on at Yosami, Aichi-ken on a scale not equalled in the world; and in April the same year it commenced sending messages direct to Berlin, Paris and Warsaw under the operation of the Nagoya Wireless Station. Thus, messages between Japan and Europe came to be sent and received between the Nagoya Station and the above three foreign wireless stations.

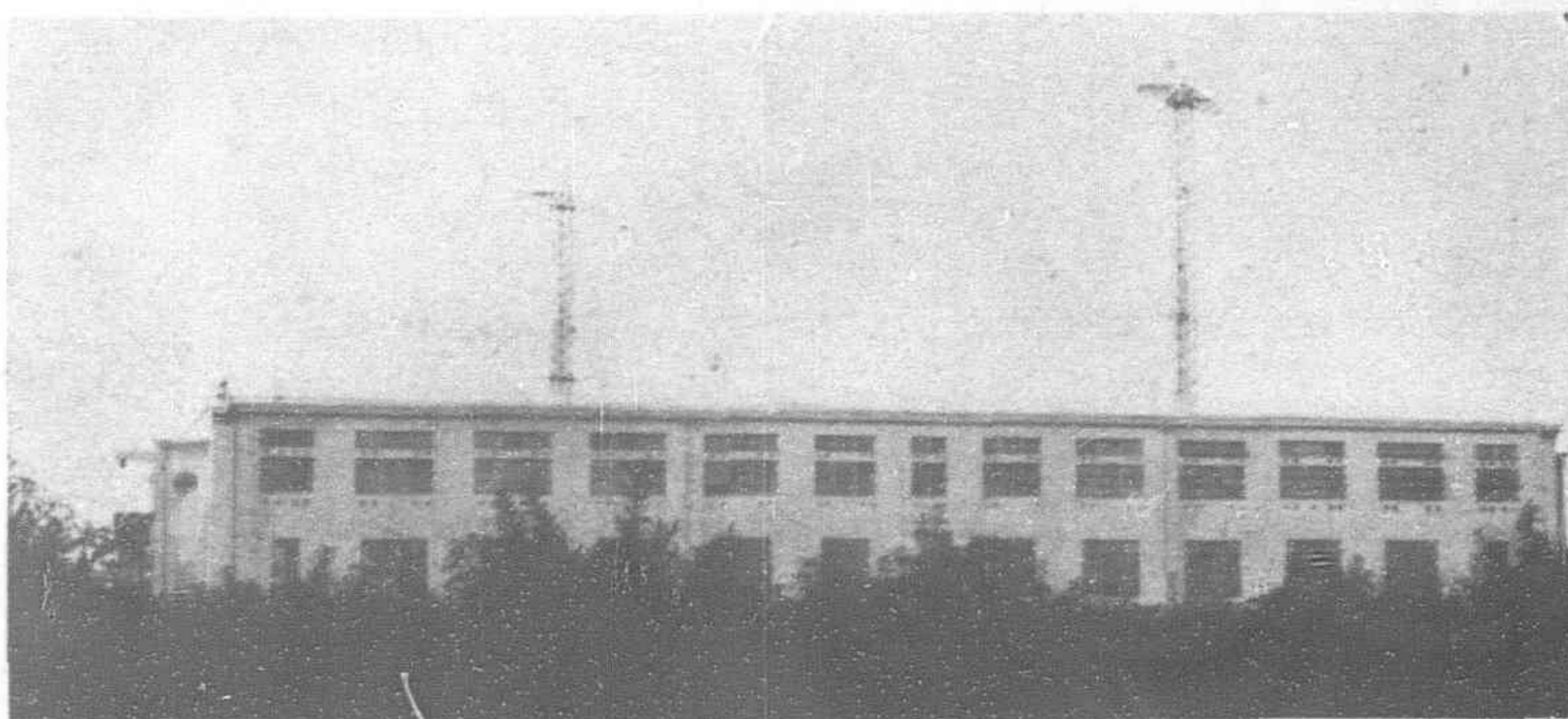
The direct exchange of messages between Japan and England was looked upon as of great importance by the Japanese Government in view of the intimate diplomatic and commercial relations between the two countries; and it had the above Yosami Sending Station and Yokkaichi Receiving Station equipped for exchanging messages between Japan and England by my company. At the end of January, 1930, the direct exchange of messages was started between Nagoya and London.

This direct exchange of wireless messages between Japan and Europe has greatly quickened the time taken for sending and receiving these messages, and between Nagoya and Berlin, between Nagoya and London, between Nagoya and Paris; and between Nagoya and Warsaw it is only about 30 minutes for each message. Even those messages sent from Japan to other European places by relay through European Wireless stations can reach destinations in about one hour.

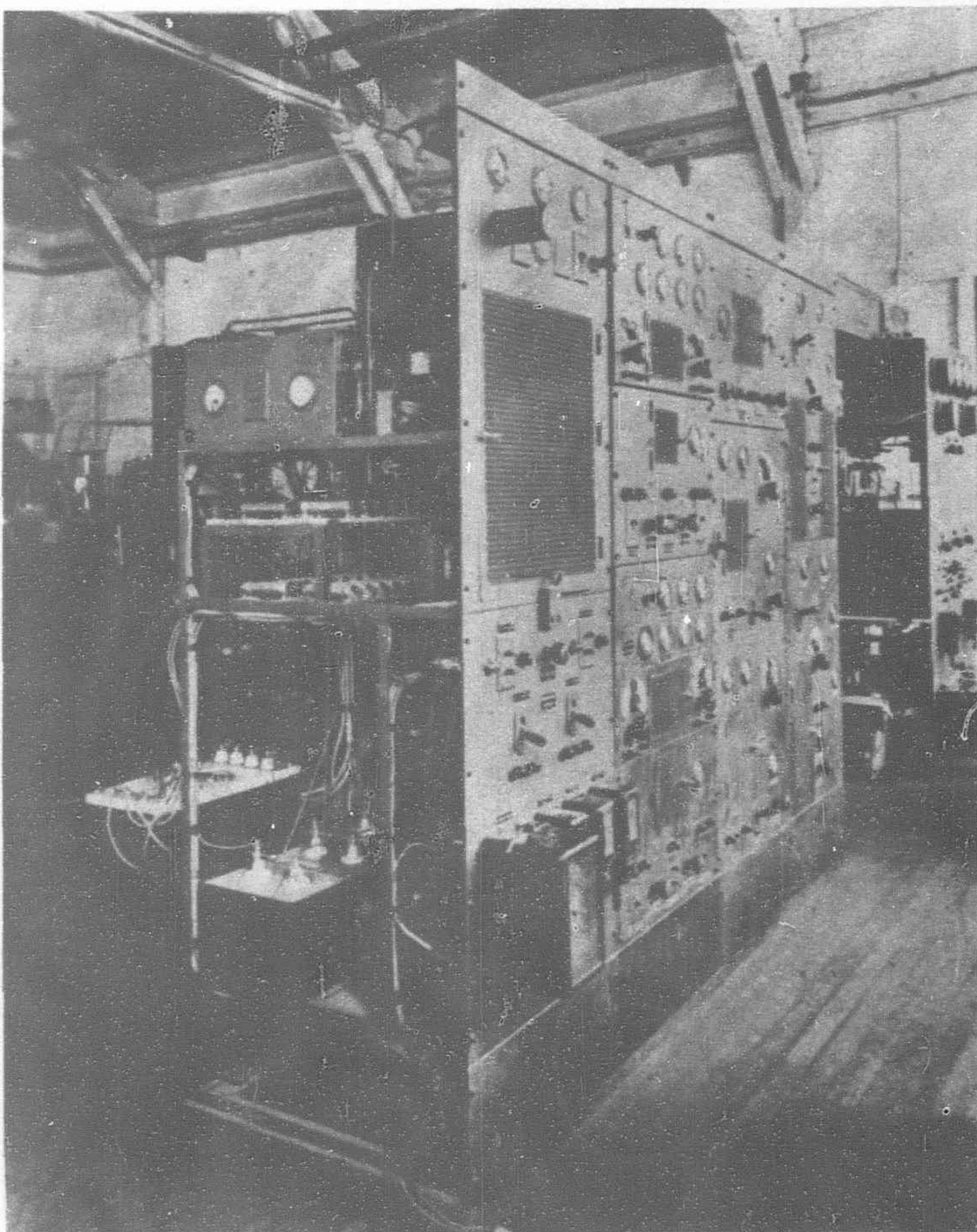
Regarding the direct exchange of wireless messages between Japan and British-

India, the Straits Settlements, the Dutch-East Indies, French Indo-China, the Philippines, Australia, China and Siberia, my company, by Government order, is building a sending station at Oyama-machi, Tochigi-ken. As to the receiving equipment, it will be arranged in the Fukuoka Receiving Station for American messages, and the extension work is well under way. On the occasion of these sending and receiving equipments being completed, messages at first will be exchanged direct between Japan and Bombay, Bandon (the Dutch-East Indies) Saigon, Manila and Sydney, under the operation of the Tokyo Wireless Station.

Concerning wireless messages with the Dutch East Indies, the Japanese Government being unable to wait until the completion of the Far Eastern-South Sea Station, started the direct exchange of messages at the beginning of October, 1929, making use of my company's wireless system with America, or the Harano-machi Sending Station, the Tomioka Short Wave-Length Sending Station, and the Fukuoka Receiving Station, with very successful results. This is, of course, only temporary, and when the sending and receiving stations of messages to and from the South Sea and Far Eastern countries as above described are completed, it will be replaced by the new System.



Oyama Transmitting Station: Under Construction to communicate with Far Eastern countries and Oceania; Rear View of Building



Short Wave Transmitting Apparatus (40 kw. Made in Japan) to be Installed in Oyama Station

My company has been also ordered by the Japanese Government to set up a further equipment for exchanging messages with America. This is to provide for communications between this country and America, which are expected to grow much busier than at present in the near future.

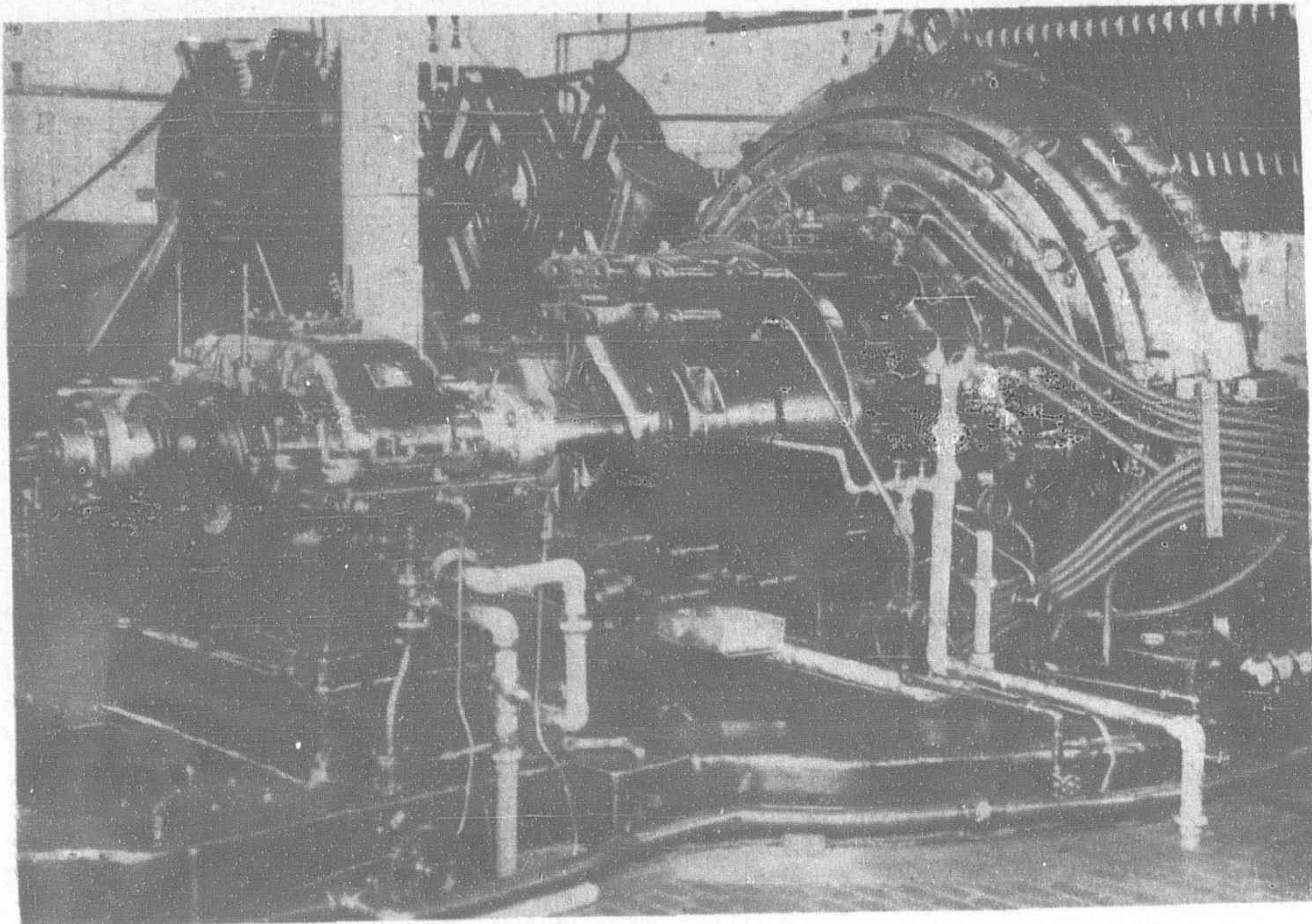
Essentially, the Japan Wireless Telegraph Co., Ltd., exists for the purpose of building wireless systems to meet the international development of Japan in politics and economics, and to satisfy the demand for wireless communications between Japan and foreign lands.

The Company's capital is Y. 20,000,000 in Y. 50 shares. The Government contributed Y. 2,300,000 in the form of the Iwaki Radio Telegraph Station, viz: Harano-machi and Tomioka stations, the latter station was then used as a receiving station, and pieces of land required for the building of radio stations at Yosami and Yokkaichi which the Government owned. In return for the contribution, the Company made over to the Government 46,000 paid-up shares.

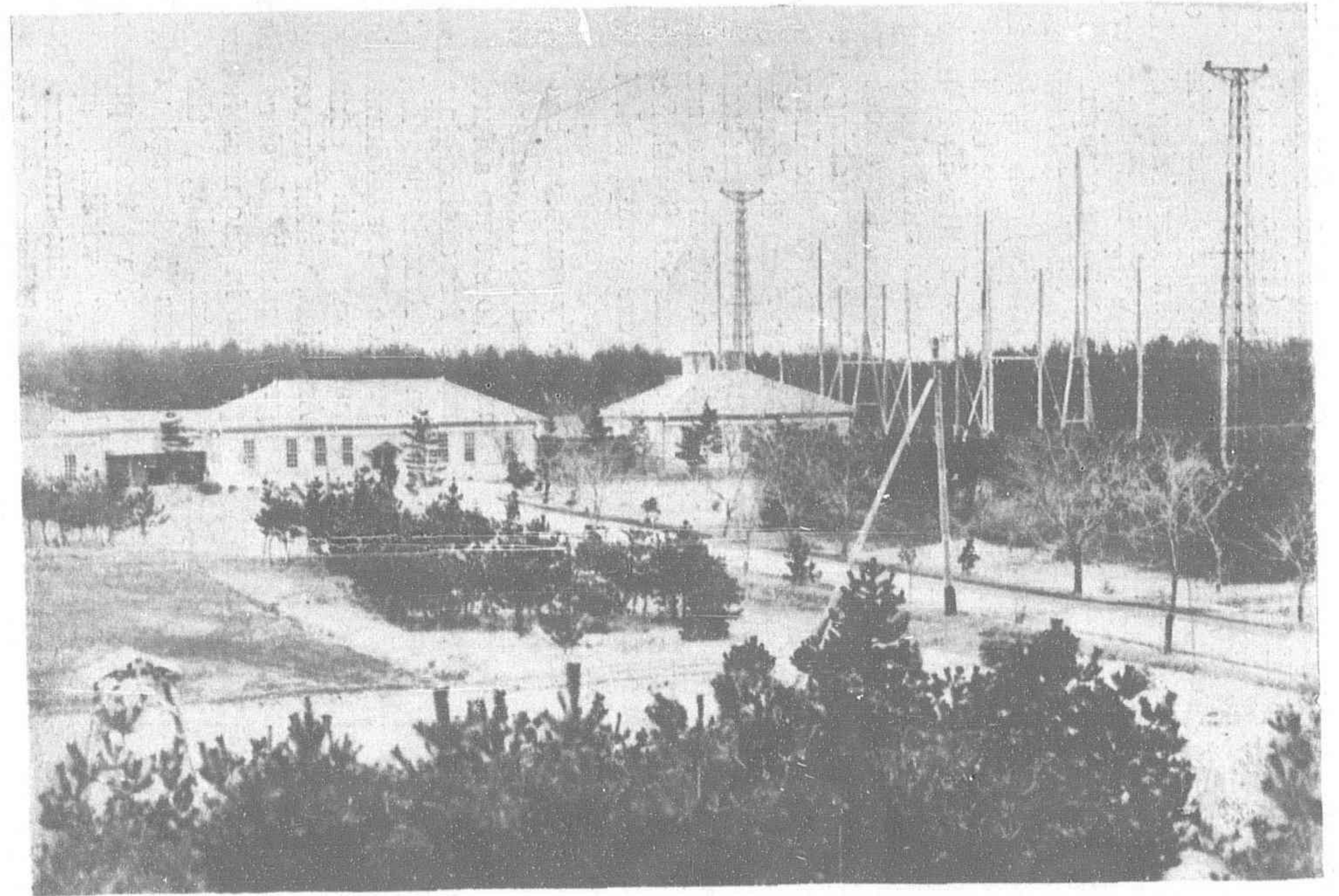
World Wide Japan's Radio Communication System

(A) Communication services of Japan with America and Hawaii are carried on between Tokyo and San Francisco through our Company's Harano-machi and Tomioka sending stations, and Fukuoka receiving station. These stations are controlled by Tokyo Central.

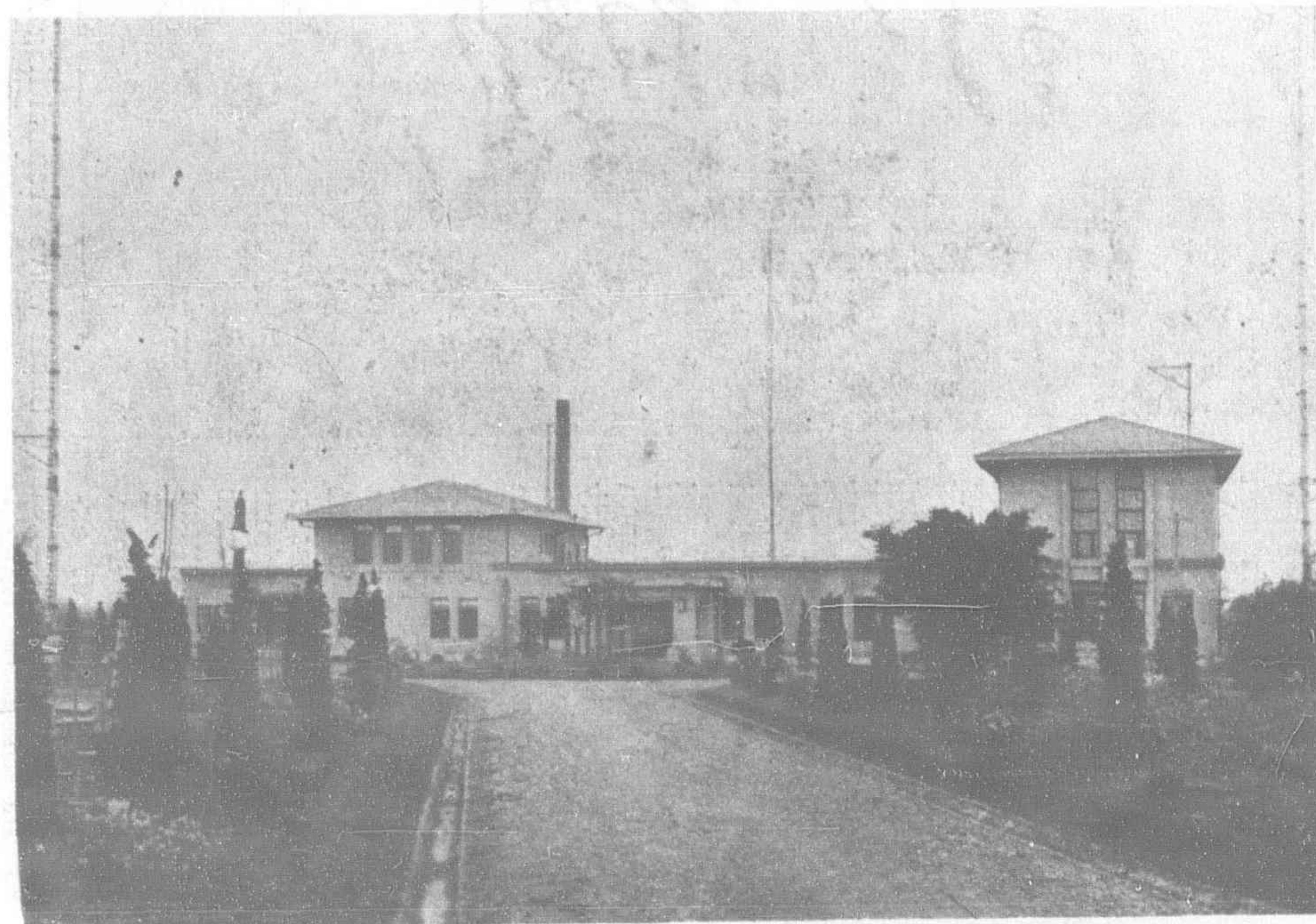
(I.)—HARANOMACHI SENDING STATION.—This station having been constructed by the Government some ten years ago, the advancement in the art radio communication of



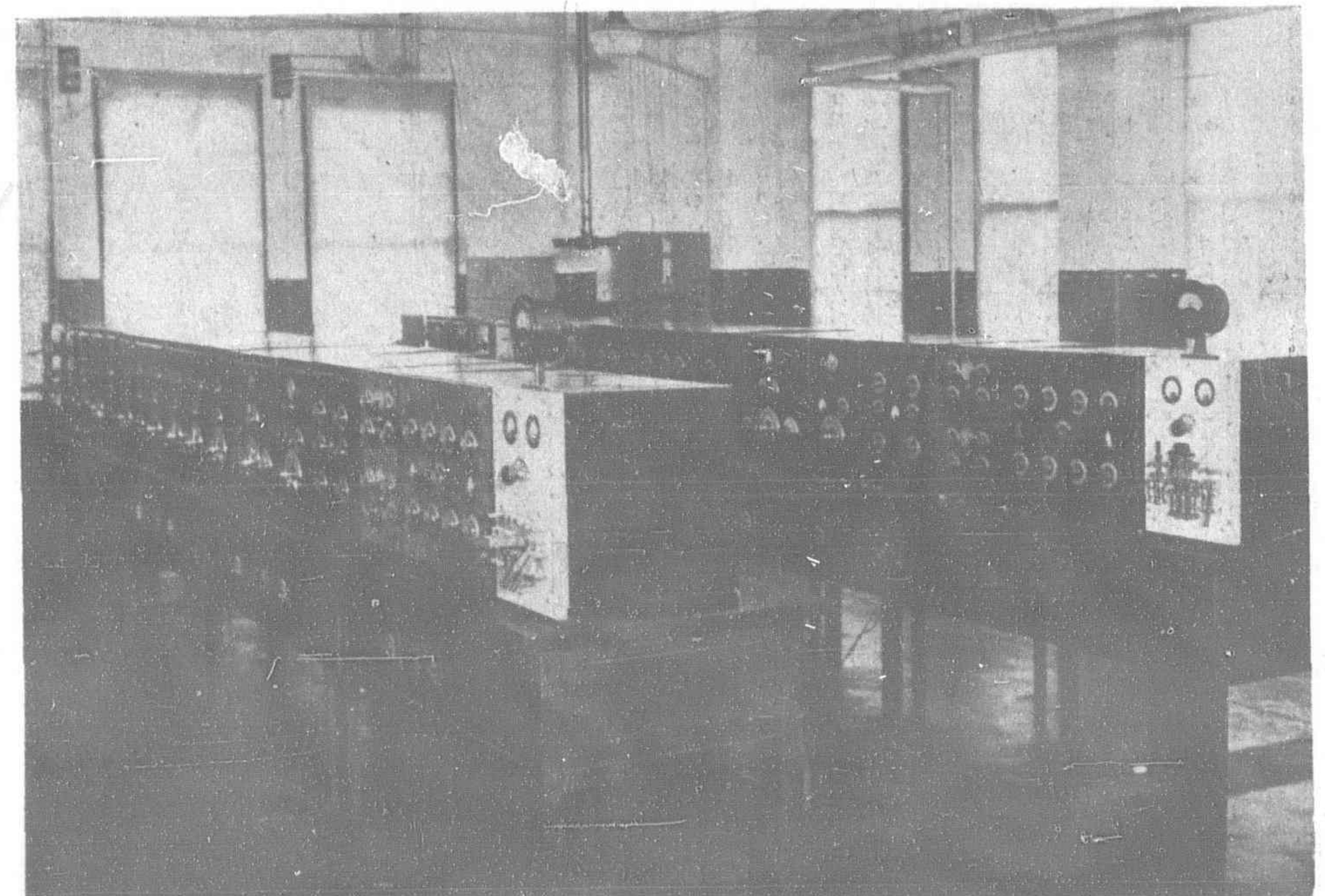
Long Wave Transmitting Apparatus (400 kw., Made in Japan) Installed at Haranomachi Station



General View of Tomioka Transmitting Station. Messages are sent at the high speed of 100 words per minute

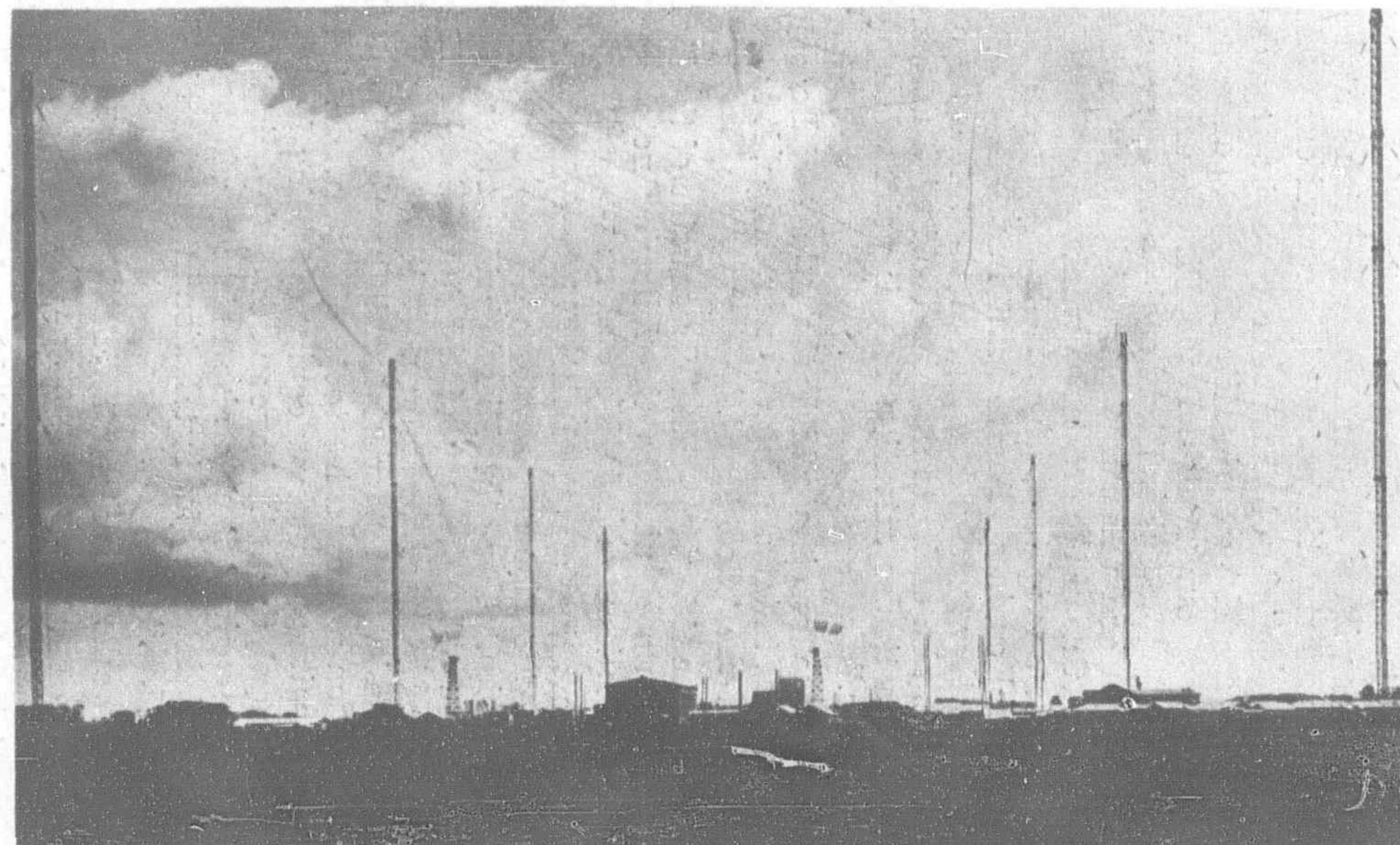


Front View of Fukuoka Receiving Station

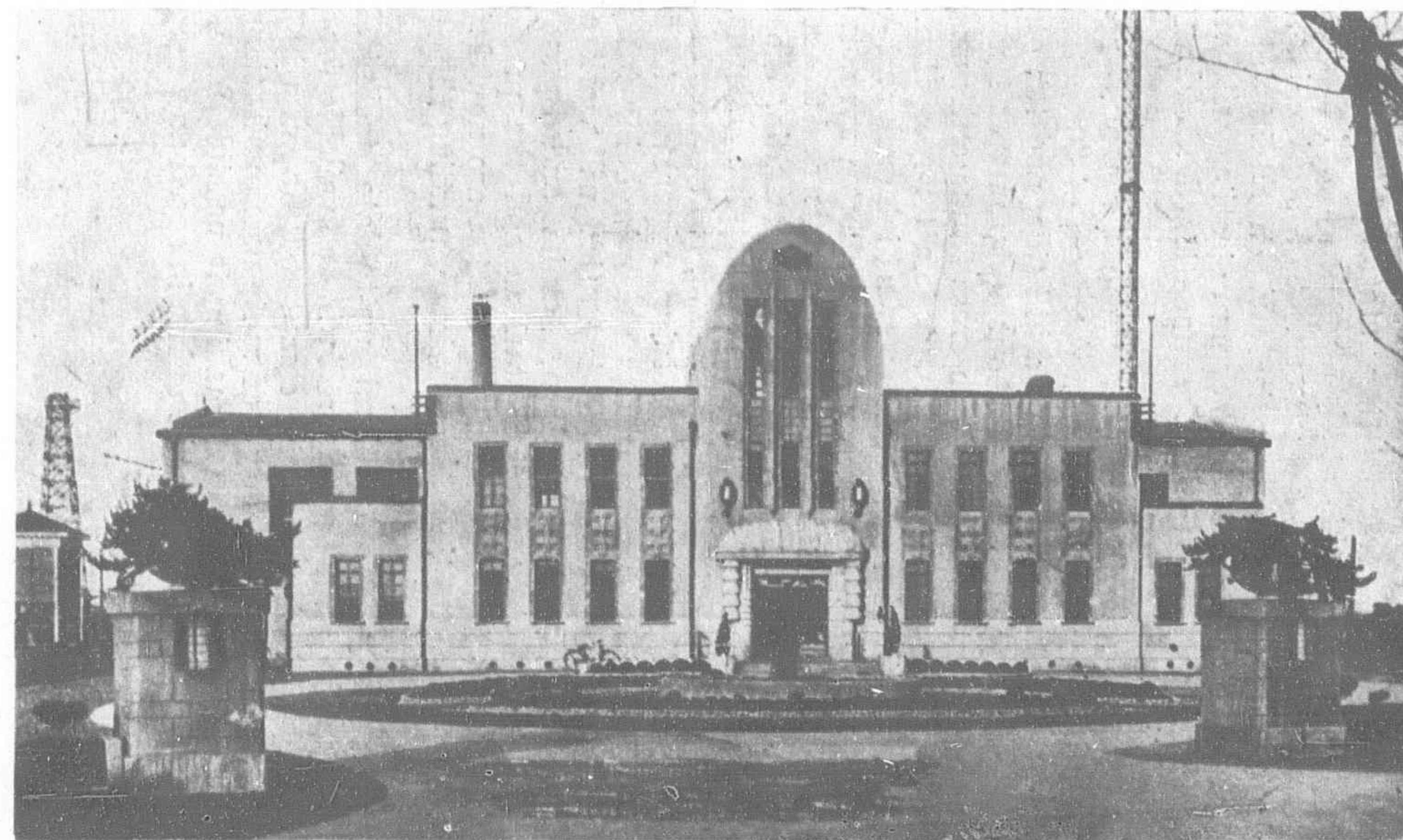


Long Wave Receiving Apparatus (Made in Japan) Installed at Fukuoka Station

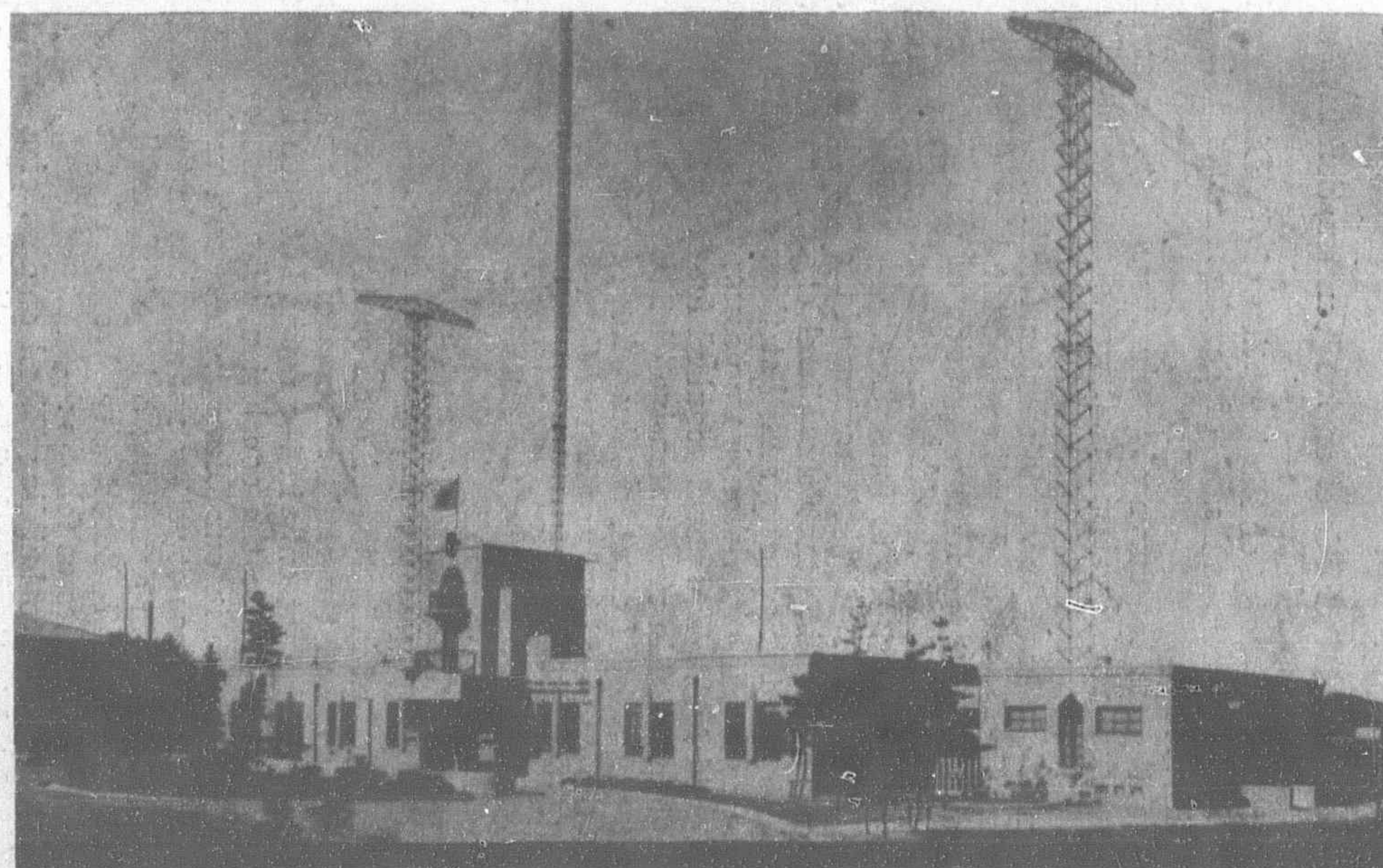
JAPAN'S RADIO COMMUNICATIONS WITH EUROPE



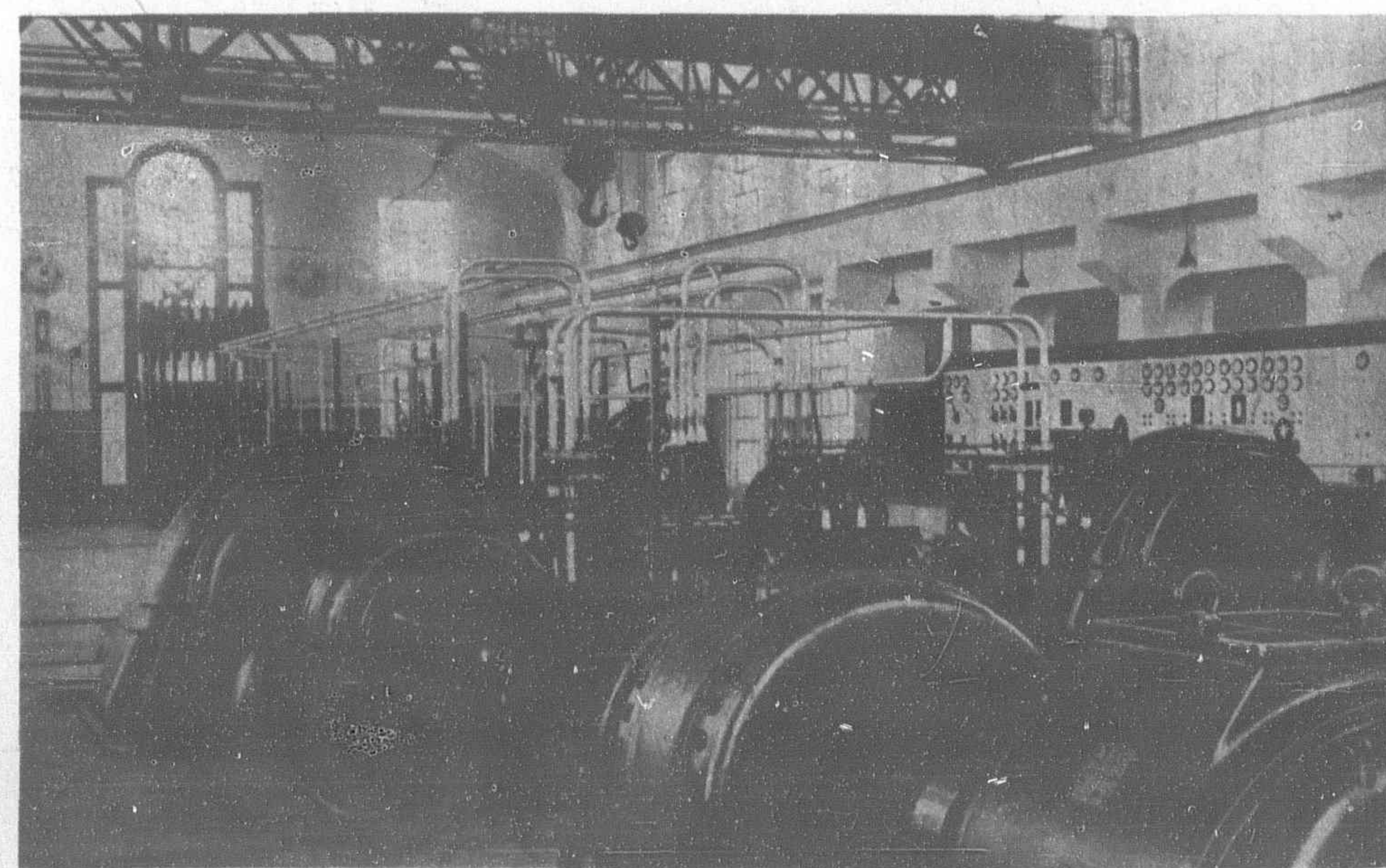
General View of Yosami Transmitting Station for sending Messages to Europe, Built in 1929



Yosami Transmitting Station Building which sends Messages Direct to Paris, Berlin and Warsaw



Front View of Yokkaichi Receiving Station



Long Wave Transmitting Apparatus at Yosami Station

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necessitated a great improvement. Now, the towers consist of one reinforced concrete and five steel ones of 200 metres in height. On the towers, flat top type antenna are strung. The effective height of the antenna is 150 m., the antenna current 500 amperes, and the radiation effect 75,000 metre amperes. The station is located about 158 miles north of Tokyo.

(II.) TOMIOKA SHORT WAVE SENDING STATION.—At this station, a 15 kw. short wave transmitter was installed in 1928 in order to conduct transmission simultaneously with the Hara no machi station. There are four sets of short wave antennæ.

(III.) FUKUOKA RECEIVING STATION.—The construction of this receiving station was finished in the early part of 1927. There are six receiving apparatus, of which two are for long wave and four for short wave reception. The antenna for long wave extends 17,802 metres in length facing toward San Francisco. Besides, there are two pairs of loop aërials. For short waves, directive multiple tuned antenna and horizontal double antenna are used.

(B) Communication services with countries in Europe are carried on through our Company's Yosami sending station and Yokkaichi receiving station. The corresponding stations in Europe are London, Berlin, Paris and Warsaw.

(I.) YOSAMI SENDING STATION.—This station is controlled by the Radio Telegraph Office in Nagoya by means of control lines of about 15 miles. For transmission on long waves, there are eight steel towers of 250 metres high each, and aërials form an antenna type of "inverted L." The estimated effective height of the antenna is about 198 metres.

The antenna current produces 750 amperes, and metre-ampere is calculated at about 148,500, surpassing any existing big powered stations.

Seven beam aërials and three sets of short wave transmitters are equipped. Two are 7 kw. and one is 40 kw. Messages to places in Europe are forwarded *via* France or

Germany or Poland or *via* Great Britain, as the case may be, through this transmitting station. Test communication carried out at this station proved the feasibility of direct communication to New York. The station is, however, intended for European service. When additional transmitters have been installed, direct communications with various points in Europe other than those mentioned above will be opened for public service.

(II.) YOKKAICHI RECEIVING STATION.—For reception on long waves, there are two towers of 60 metres high each, one of which is situated at a hill side, and the other near the sea side at a distance of about 4,000 metres from each other, supporting a pair of double cross frame antenna and vertical antenna for multiplex double-goniometer-reception. Also there are three steel towers of 60 metres high each and four ordinary frame aërials. For reception on short waves, there are two towers of 85 metres besides other aërials, and five receiving sets.

(C) The sending station for British India, the Dutch East Indies, French Indo-China, the Philippine Islands, Australia, China, Siberia and Straits Settlements, is in course of construction at Oyama, Tochigi-ken. Receiving apparatus to be used on the service with these countries are now being installed at our Fukuoka receiving station. This station will work with stations at Bombay, Bandœng, Saigon, Manila and Sydney. Haranomachi and Tomioka sending stations and the present receiving installation at Fukuoka receiving station are now being used, *ad interim*, on the service with Bandœng, pending the completion of Oyama and Fukuoka stations.

The most advanced and up-to-date technical skill and experience that can be procured will be available for the installation of new stations. When completed, Japan will be provided with the best possible means of radio communications with many countries in the world, thus making it possible for her to render a better service to the general public in speed and accuracy.

Diesel Engine Construction in Russia

THE *Torgovo-Promyshlennaya Gazeta* (Commercial and Industrial Gazette), Moscow, in its issue of October 19, 1929, publishes a report on the state of Diesel engine construction in Russia. The newspaper writes as follows:—

"The 30th anniversary of the invention of the Diesel engine coincides with a hitherto unheard of development of this type of heat engine...."

"In recent years the curve of production, plotted according to horsepower, has rapidly risen in all works constructing Diesel engines, until it now by far surpasses all former achievements in this branch of heavy machine construction.... From 1898 to 1926 Sulzer Brothers built Diesel engines totalling about 2,000,000 b.h.p., and in 1929 the total production of this firm already exceeded 3,000,000 b.h.p., the last increase of 1,000,000 b.h.p. being attained in only three to four years."

"Considering this triumphal progress of the Diesel engine.... it is certainly astonishing that the Diesel engine has been very little appreciated in this country and that there seems to be a reluctance here to develop it, although we possess the largest sources of natural liquid fuel. The power required for industrial purposes and for municipalities in very extensive districts in our Union is, in the great majority of cases, obtained from liquid fuel, in consequence of the geographical position of these localities (Northern Caucasus, Middle and Lower Volga districts, South-West and Central Asia); this will continue to be the case in future. In addition to that, the districts in which liquid fuel can be used will soon be greatly extended, with the success which will doubtless be obtained by several geological investigations at present being carried out. Also when the industrialization of our country districts is taken into consideration, and the rapid increase of small and medium-sized electricity works not only in the towns but even in country villages, one must come to the conclusion that such extensions will require an increase in our Diesel engine construction in the near future, such as it has not yet seen at any time in the past...."

The same journal, in describing a large Sulzer Diesel engine built by the "Kharkoff Locomotive Works of the Southern Engineering Trust," writes as follows:—

"The change-over to building Diesel engines of a new type has been completed in the Kharkoff Locomotive Works and in the

words of the Leningrad Engineering Trust based on arrangements concluded with Sulzer Brothers regarding technical assistance, in accordance with which the firm in question places all necessary drawings and instructions at the disposal of our works.

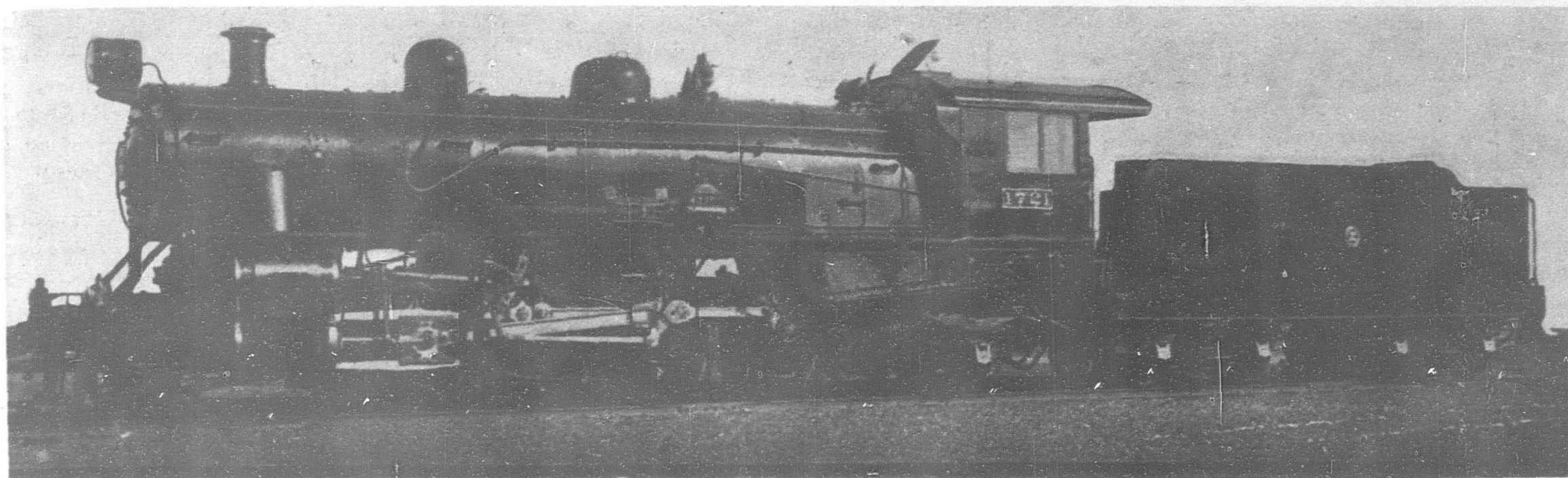
"Diesel engines of the Sulzer type are regarded in Europe as first-class propelling engines for ships and possess a large number of advantages compared with the Diesel engines hitherto built in our works. The Sulzer Diesel engines are distinguished by their simple design and the ease with which any overhauling can be carried out. One of the greatest advantages appears to be its comparatively low weight, which is 20 to 25 per cent less than that of the Diesel engines hitherto built in the Kharkoff Locomotive Works; another great advantage is the interchangeability of all parts. It is also easier to machine the individual parts, since the firm paid particular attention to this point when preparing their new designs."

"For the services which the Kharkoff Locomotive Works have rendered in introducing this new design, it has been awarded the order of the 'Red Flag'."

Under the title "The first Diesel engine of the Baltic Shipyard the same journal publishes the following note regarding Sulzer engines in its issue of 16th November:—

"A short time ago the Baltic Shipyard finished the first 2,000-b.h.p. Diesel engine and started work on the second engine of the same series. Two other Diesel engines are also at present under construction. The delivery of the first Diesel engine is a great event in the history of the factory. Without any special experience, and almost without any special capital outlay, *i.e.* without spending money on new machine tools, etc. (the Diesel engines having been built without any new equipment being found necessary for the workshops), the works have succeeded in delivering a thoroughly satisfactory engine; it was also finished before the agreed time. The engine is intended for installation in a motorship of the Crimea-Caucasus Line."

"The works have shown their ability to build this new engine, but are not satisfied with that. Within a short time they will start building Diesel engines of the Sulzer type, in units of 2,700 b.h.p. It is intended to build 10 such engines."



"Mikado" Type Locomotive, Built at the Keijo Workshops of the Chosen Government Railways

Chosen Government Railways

New Construction Program

IN a few short years the Soviet program of industrial and railway expansion with its concomitant political and strategic objectives for the communization of Asia, has turned back the pages of history to 1905 when the conquering advance of Russia was checked at Mukden. The Soviet is resuming the forward march of the Bear where the old régime left off. Europe and America, far removed from actual contact with events in Asia, fail to realize the danger involved in this new Slav urge for expansion. Continuous civil warfare in China, engrossing the attention of the world, has overshadowed developments in Siberia and Central Asia. China lies helpless and prostrate, dependent upon the jealousies of the Great Powers, the Kellogg Pact, the Four and Nine Power Treaties and the League of Nations to preserve intact her territorial integrity. To all outward appearances, Japan, the nation most concerned with events that may once again start her armies moving northwards over the Yalu and into Manchuria, is making no preparations to meet the impending clash. Japan may feel secure in her strength; or there may be a deep wisdom to her seeming indifference to the forces gathering momentum in regions west of Baikal. Japan has learned that the world will accept as a matter of course any Russian inroad upon China's territory while the slightest move on her part which might be even remotely construed as an infringement of China's sovereignty is blazoned abroad as corroborative evidence of her imperialistic and aggressive designs. The Chinese will accept without a whimper any indignity or humiliation heaped upon them by Russia, but let some Japanese statesman announce that Japan will protect her economic interests and investments in Manchuria and they will appeal to the League of Nations and the United States for protection against these "thinly disguised designs of Japan to annex their territory." Russia and China can come together in open or secret alliance and Japan may not prepare to defend herself against the danger without inviting world hostility and criticism. Japan can make no open move to defend herself against any menace from the direction of Central Asia.

The key to Japan's national security is the little peninsula that juts out from the mainland

like a dagger pointed at her heart. Thirty-five years ago, in revenge for her defeat at the hands of Japan, China handed over the hilt of the dagger to Russia in order that the latter might strike and drive home the blow she herself was incapable of delivering. Japan watched with growing alarm the preparations for her undoing, and struck first. She now owns the dagger and has forged it into a battle-axe whose edge is turned towards those who would have terminated her existence in 1904. Japan's dominant position in Eastern Asia, her ability to maintain and defend her economic and strategic position in Manchuria and insure her homeland against any aggression from the West, is derived from her possession of Korea, providing facilities for the rapid mobilization of her armies and their transport to any menaced point of her frontiers, or if needs be, to the center of Manchuria.

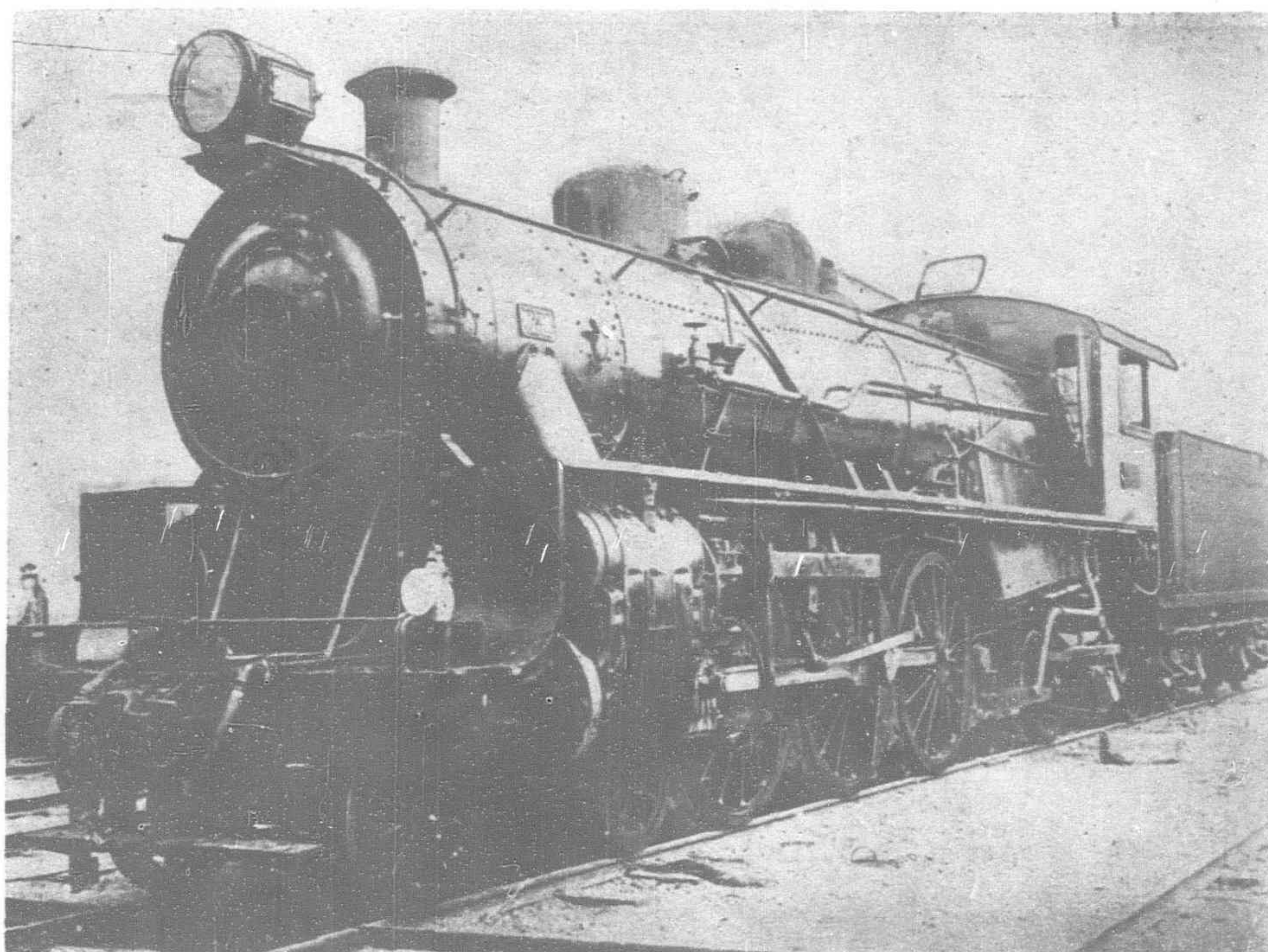
Korea owes its initial prosperity to the urgent strategic needs of the Empire. Immediately after signing the Portsmouth Peace Treaty, the Czar started gigantic preparations to resume the conflict and Japan through sheer necessity, was forced to keep pace with these thinly-veiled warlike movements and build railways in Korea to supplement the original line from Fusan to Wiju. The financial condition of the Korean Government however never permitted any spectacular construction program. The Great War and the collapse of Russia temporarily relieved the strain of these expenditures, enabling the Imperial Government to concentrate its energies and finances on other important schemes of national reconstruction and defence.

The development of Korea on a large scale was practically abandoned and a country nearly as large as the main island of Japan, immensely rich in natural resources, was permitted to lag

behind in the march of progress. Japan now wakes up to find that the Chinese are proceeding with a program of railway construction in Manchuria in which many of the lines violate formal agreements between the two governments. The strategic possibilities of these lines constitute a direct challenge to the basic policies of Russia. The Soviet has responded by announcing a Fifteen Year Railway Program to cost \$9,000,000,000, which if carried out in



Keijo Station



"Pacific" Type Locomotive on Chosen Government Railways

connection with the Five Year Industrial Plan, will change the strategic map of Central and Northeastern Asia and revive the menace that Japan so valiantly drove back in 1905. The network of new Manchurian railways, together with the projected Soviet developments make essential and immediate construction of several supplementary railways in Korea terminating at points along the northern frontier, which are now exposed to invasion from the north, except at the extreme eastern and western ends.

During the Great War the management and operation of the Chosen State Railways was entrusted to the South Manchuria Railway Company under a contract that was liquidated in March 1925, when the lines once more were brought under the direction of the Railway Bureau of the Chosen Government. This bureau was reorganized on April 1st, 1925 to supervise the operation of the state railways and all business relating to the private railways and tramways. The Bureau is now organized under the following sections :

ORGANIZATION OF RAILWAY BUREAU OF GOVERNMENT- GENERAL OF CHosen (1929).

General Affairs Section :—Documents, Records and Correspondence, Personnel Affairs, Social Works, Railway Hospital, Railway Library.

Private Railways Supervising Section :—Superintendence and Control, Technical.

Traffic Section :—General Affairs, Hotels, Buffets, Dining Car Service, Passenger Traffic, Goods Traffic, Freight Car Distribution, Auditing.

Train Operating Section :—General Affairs, Trains, Communications, Telephones and Telegraphs, Rolling Stock.

Maintenance of Way and Construction Section :—General Affairs, Maintenance of Way and Construction, Electricity, Building, Investigation.

Mechanical Section :—General Affairs, Vehicles, Works. (Mechanical, Electric).

Treasury and Stores Section :—General Affairs, Accounting, Storehouse, Purchase of Railway Stores (materials), Conditioning.

Divisional Traffic Offices :—Station, Goods Station, Jurisdiction of Trains, Jurisdiction of Locomotives, Repairing, Technical, Accounts.

Seishin District Superintendence Office :—General Affairs, Traffic, Maintenance of Way Communication : telephone, telegraph, Construction, Technical, Accounts.

Divisional Engineering Office :—General Affairs and Technical : Maintenance of Way, Communications, Telephone and Telegraph, Construction.

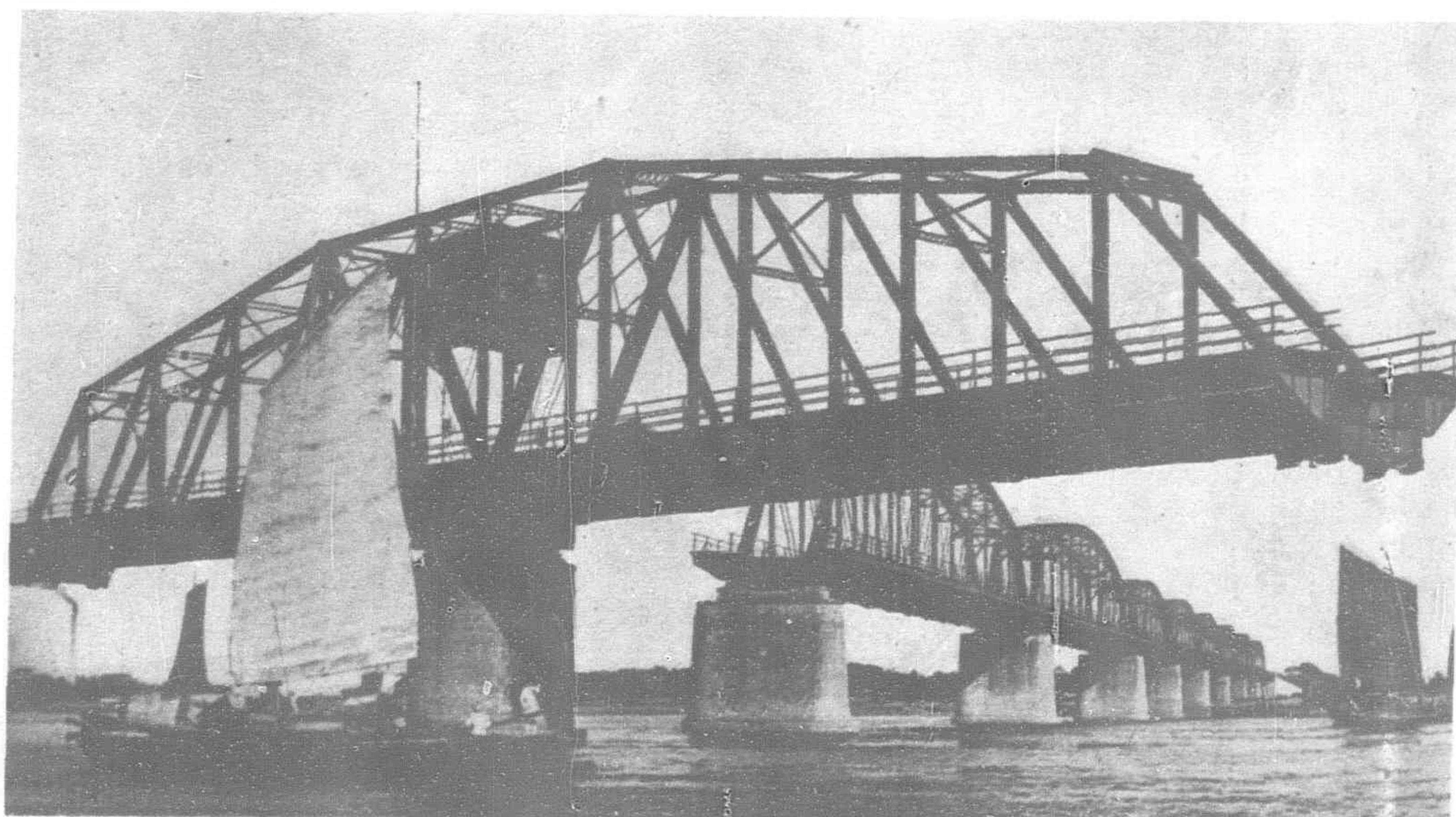
Keijo Workshop :—General Affairs: I Works, II Works, Heijo Branch Workshop.

Fusan Workshop :—General Affairs, Various Plants.

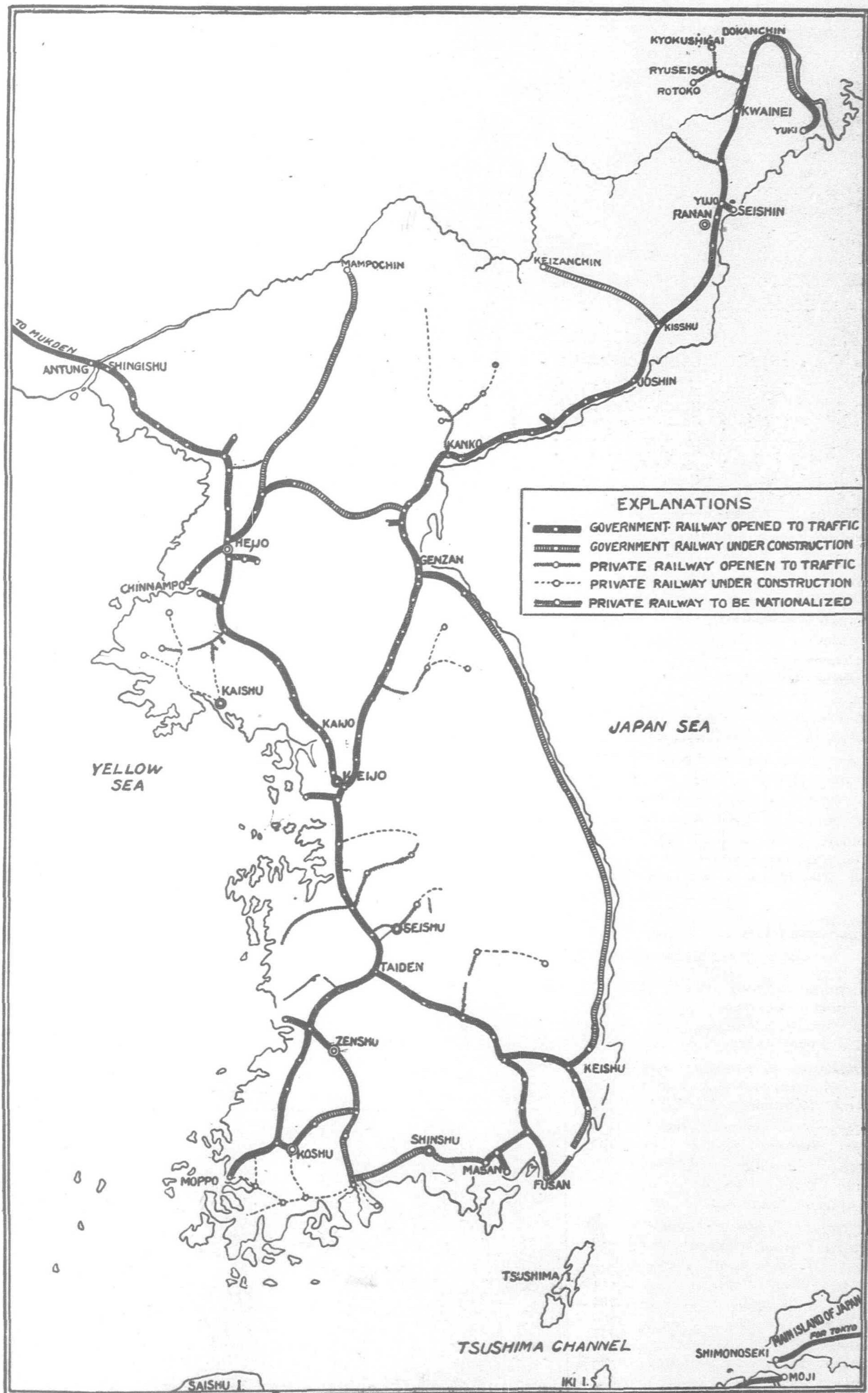
Employees' Training School :—Regular Course, Apprenticeship Course, Course in Telegraphy, Short Course.

The length of all Government and Private Railways and Tramways in Chosen under the direction of the bureau on May 31, 1929, is given in the following table :

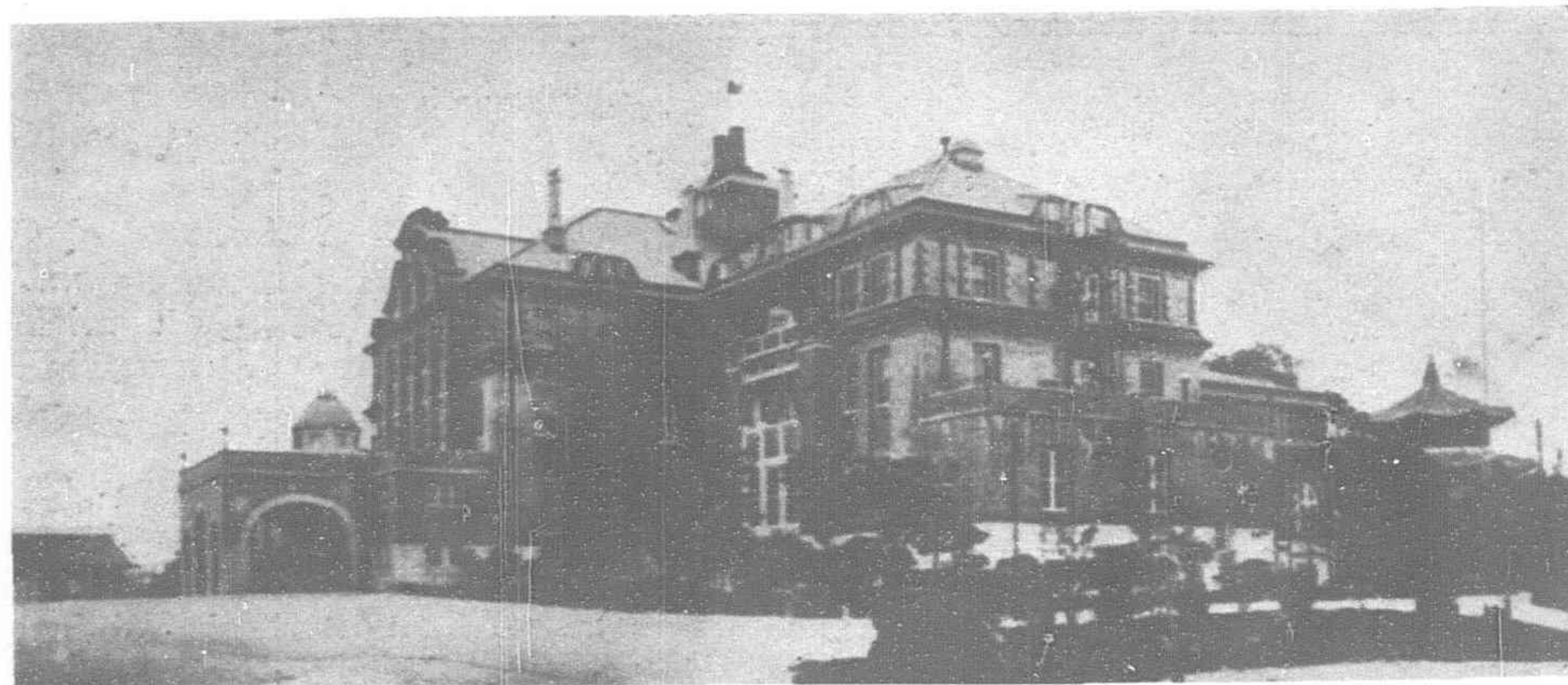
GOVERNMENT RAILWAYS. (LINES OPENED TO TRAFFIC)			
	Line	Section	Mile
1. Kei-Fu Line	Kei-Fu Main Line	Fusan-Keijo	280.6
	Masan Line	Sanroshin-Masan	24.8
	Chinkai Line	Shogen-Chinkai	12.8
	Kei-Jin Line	Eitoho-Jinsen	19.4
2. Kei-Gi Line	Kei-Gi Main Line	Keijo-Antung	310.2
	Kenjiho Line	Koshu-Kenjiho	8.1
	Heijo Coal Mine Line	Daidoko-Shokori	14.5
	Heinan Line	Heijo-Chinnampo	34.3
	Hakusen Line	Mochuri-Hakusen	5.8
	Shingishu Goods Line	Shingishu-Goods station	1.1
3. Konan Line	Konan Main Line	Taiden-Moppo	162.2
	Kunsan Line	Riri-Kunsan	14.3
4. Kei-Zen Line	Kei-Zen North Line	Riri-Zenshu (narrow gauge)	15.5
	Koshu Line	Shoteiri-Tanyo	22.7
5. Kei-Gen Line		Ryuzan-Genzan	138.9
6. Kankyo Line	Kankyo Main Line	Genzan-Kainei	383.8
	Sendairi Line	Ryutan-Sendairi	2.7
	Seishin Line	Seishin-Yujo	5.6
	Kainei Coal Mine Line	Kainei-Keirin	6.6
7. Hei-Gen Western Line		Seiho-Junsen	29.3
	Tokai Middle Line	Taikyu-Kakusan	66.7
	Tomon Line	Keishu-Urusan	25.8
		Kainei-Dokanchin	37.0
Total			1,622.7



Swing Bridge Over the Yalu at Antung



Sketch Map of the Korean Railways



Chosen Hotel at Keijo: Operated by the Chosen Government Railway Bureau

PRIVATE RAILWAYS

8. Chuhoku Line	Chochiin-Chushu	58.4
9. Keihoku Line	Kinsen-Reisen	*53.0
11. Keinan Line	Masan-Shinshu	*43.5
12. Kokai Line	Shariin-Shinsen	21.8
	Jokai-Naito	9.4
	Kasan-Shin-in	11.0
	Shin-in-Kasei	3.5
13. Kannan Line	Kanko-Jotsu	18.8
	Goro-Kannan Shoko	26.7
	Hojo-Choho	1.6
14. Kanhoku Line	Komosan-Shinten	22.2
Sub-total		269.9
15. Keinan Rly. Co. Line	Ten-an-Koshu	*46.8
	Ten-an-Chokoin	*43.4
Chosen Gas Electric Rly.	Fusanchin-Onsenjo	5.9
16. Kongosan Electric Rly. Co. Line	Tetsugen-Kenri	*51.4
17. Kaisen Rly. Co. Line	Shin-anshu-Sento	23.0
Total		440.4

TRAMWAYS.

Keijo Electric Tramway	Keijo and suburbs	20.2
Chosen Gas Electric Tramway	Fusan	6.1
Heijo Municipal Electric Tramway	Heijo and suburbs	7.5
Waikan Tramway	Waikan station-Rakutoko	0.7
Kokei Tramway	Kokei	1.0
Kintei Tramway	Kintei	1.3
Kampoku Tramway	Kyojo-Seikirei	4.7
Seishin Tramway	Seishin	0.6
Kampeit Tramway	Kakukyo-Kampeit	3.8
Reibu Tramway	Reibu-Daibori	2.0
Total		47.9

GOVERNMENT RAILWAYS.

Hei-Gen Western Line	Junsen-Shinso	12.3
Tomon Line	Yuki-Shinasan	41.4
Tokai Line	Ampen-Kyukoku	19.7
Total		73.4

PRIVATE RAILWAYS.

Kokai Line	Shinsen-Suikyo	17.9
Kongosan Electric Railway	Shodo-Kongo-Kuchi	34.4
Keinan Railway	Kosen-Choko	45.2
Nansen Railway	Tokuro-Homei	15.8
Total		113.3

TRAMWAY

Gyodaishin Tramway	Gyodaishin-Ryuhei	3.7
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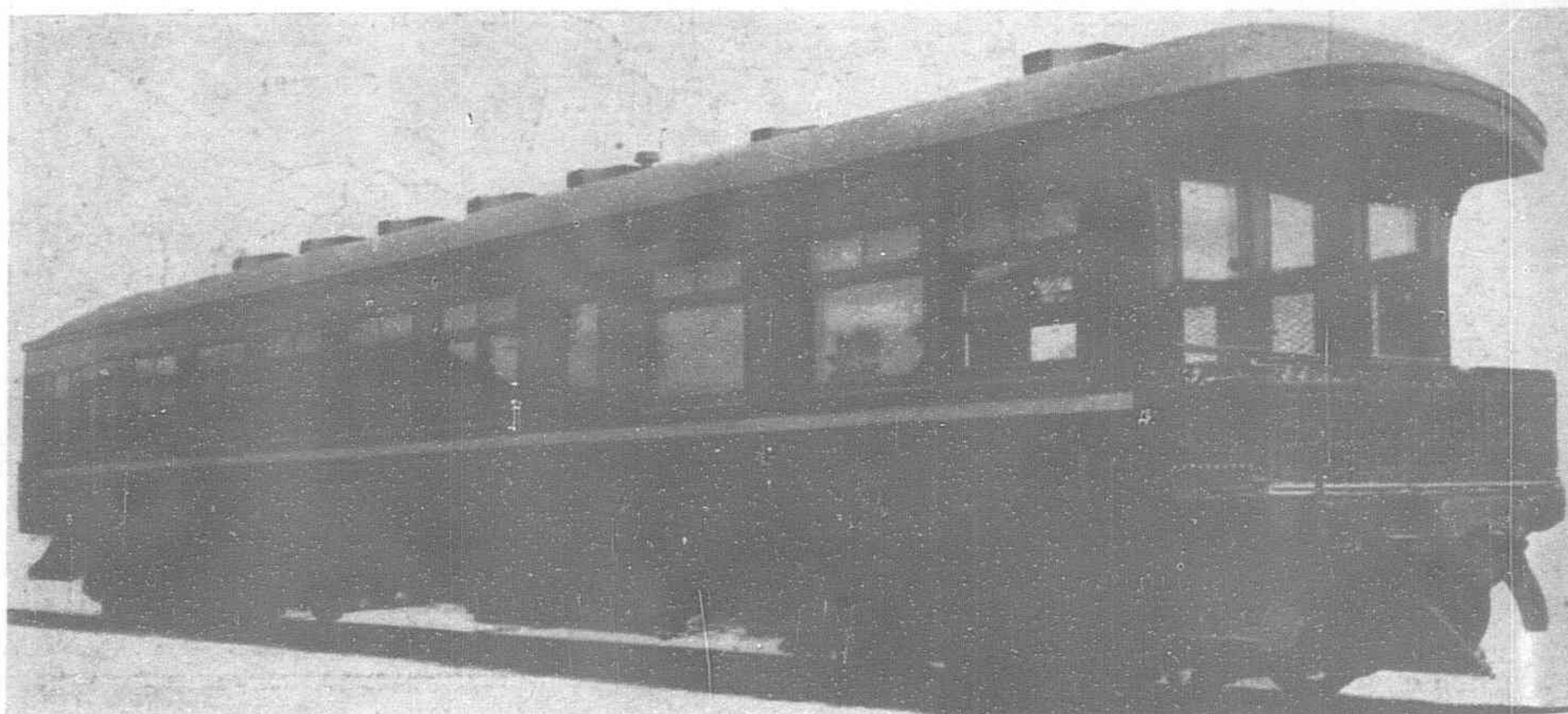
The capital investment on the State Railways in operation to March 31, 1927, amounted to Yen: 319,700,000, the estimate of Revenue and Expenses for the fiscal year 1928 being:

ESTIMATE OF REVENUE AND EXPENSES IN THE FISCAL YEAR OF 1928.

Revenue of Railway	.. ..	62,190,315
Traffic Revenue	.. ..	40,971,639
Passenger receipts	.. ..	19,509,248
Freight receipts	.. ..	21,462,391
Miscellaneous receipts	.. ..	1,928,791
Warehouse receipts	.. ..	87,000
Hotel receipts	.. ..	898,167
Hospital receipts	.. ..	87,056
Miscellaneous receipts	.. ..	856,568
Provisionary receipts and loan	.. ..	19,289,885
Receipts of entrusted railway work	.. ..	170,640
Total	.. ..	62,360,955

Railway working expenses	.. ..	49,912,662
Salary	.. ..	2,192,540
Chokunin rank	.. ..	31,360
Sonin rank	.. ..	251,846
Hannin rank	.. ..	1,909,334
Business expenses	.. ..	28,156,937
General expenses	.. ..	881,652
Maintenance of way	.. ..	6,717,579
Rolling stock improvement	.. ..	3,852,184
Train operation	.. ..	8,864,532
Traffic expenses	.. ..	5,001,589
Hotel expenses	.. ..	875,650
Hospital and Medical treatment	.. ..	218,700
Special allowances	.. ..	560,000
Representative cost	.. ..	10,000
Reserve	.. ..	700,000
Grants to Mutual Relief Association	.. ..	303,411
Entrusted railway works	.. ..	170,640
Advance to miscellaneous refund and replenishment of losses	.. ..	19,563,185
Total	.. ..	49,912,662
Balance	.. ..	12,448,293

Although the general development of Chosen has made remarkable strides in the last decade, greater progress could have been made had Japan's financial condition permitted a more rapid construction of essential railways. The total area of Chosen is 83,370 sq. miles, equivalent to about 95 per cent of the main island of Japan. Of this area, 5,000,000 *chobu* (12,250,000 acres) is available for agriculture and stock raising. The mountain ranges along the northern frontier and forming the backbone of the peninsula are covered with virgin forests, estimated to contain 1,000,000,000 *shukujume* (cubic feet) of timber, with rich deposits of gold, silver and other minerals. The six thousand mile coast line of the peninsula teems with fish and marine products. Reserves of water power with a combined capacity of 1,250,000 h.p. await development in the interior. Lack of cheap and rapid transportation has been the main reason for the failure to properly develop these natural resources, which would materially increase the wealth of Japan and help solve her fundamental problems. On the other hand, as outlined above, defense considerations make imperative the early construction of new lines along the 800 mile northern frontier which is frequently ravaged by armed bands crossing the frozen rivers in winter. The Soviet railway program and the steady increase in new Chinese lines in Manchuria will probably give an impetus to the Chosen 12 year program approved by the Diet in 1927. If Japan is to maintain her strategic superiority in a region that is almost certain to again become the theater of a colossal struggle, these new Korean lines must be built. The delay on the part of the Chinese authorities to grant permission for the construction of the link connecting the Kirin-Tunhwa line with the Tomon Line of Chosen, is seriously impairing not only their own defense, but that of Japan, and unless it is taken in hand before too late, the consequences may be serious for both countries. The development of these vast areas of virgin agricultural and forest lands in Eastern Manchuria, so essential to the solution of Japan's food problem and industrial progress, is one of the tasks that China and Japan should undertake at once. Concessions on both sides must be made in order that the products of this region can find their natural outlet through the nearest sea-port on the Korean coast. While it may be to China's political interest and advantage to have the produce of this region transported southwards to a

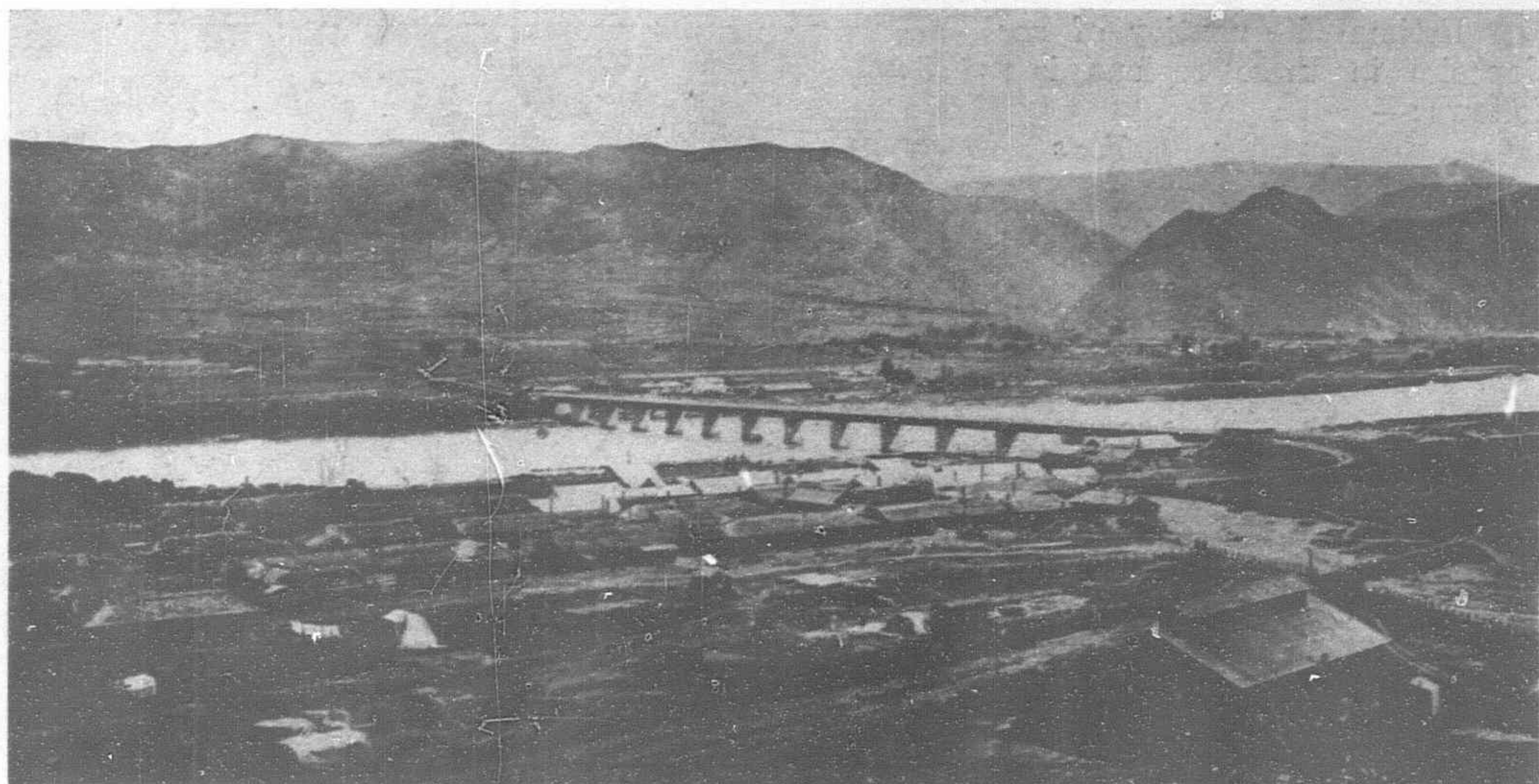


First Class Sleeping and Observation Car Built at the Keijo Workshops of the C.G.R.

port under her own jurisdiction, the freight charges would be so heavy as to seriously retard the development of Kirin province. The market for the bulk of the produce of these Eastern Manchurian districts is Japan, and nothing should be permitted to interfere with this natural flow of trade by imposing heavy transportation costs. The rule works both ways, enabling the Manchurian farmers to procure their manufactured products from Japan at a cost much lower than if they were routed through Dairen. The construction of the Tunhwa-Seishin Line either by Chinese or Japanese capital, therefore becomes a most important feature of the Chosen Government plans for the development of its northern frontier provinces.

The Government General of Chosen has for several years past urged upon the Imperial authorities in Tokyo the necessity of completing several new lines, which aside from their legitimate object of promoting the prosperity of Korea and solving Japan's basic problems, are essential to the national defense. In 1926, the Governor General of Chosen planned the construction of five new lines and the acquisition by purchase of several private railways, at an estimated cost of Yen : 320,000,000 to be distributed over a period of 12 years. This program will add another 600 miles to the state system and bring the total length of lines up to 3,500 miles, an average of 4.1 miles per 100 sq. miles of territory.

Although this very modest development will have a wonderful effect upon the growth of industry and national wealth, it falls far short of the urgent needs of the peninsula. The projection of these new lines into the border regions, becomes vitally essential to the existence of the Empire itself. Japan is confronted with a food and population problem that demands the immediate development of all regions within the Empire suitable for producing food and raw materials. International agreements for the lowering of tariffs, access to raw materials, and immigration may relieve Japan's immediate distress, but it is not wise for any government to rely on these measures for a permanent solution to its problems as long as it has an outlet for the energies of its people at home. A ten year vigorous program of railway and industrial development in Korea, would create many new sources of national wealth that would relieve the pressure in Japan, and place the Empire on a



New Railway Bridge Over the Tumen River

much stronger strategic position to face the menace that is rapidly assuming alarming proportions in the North.

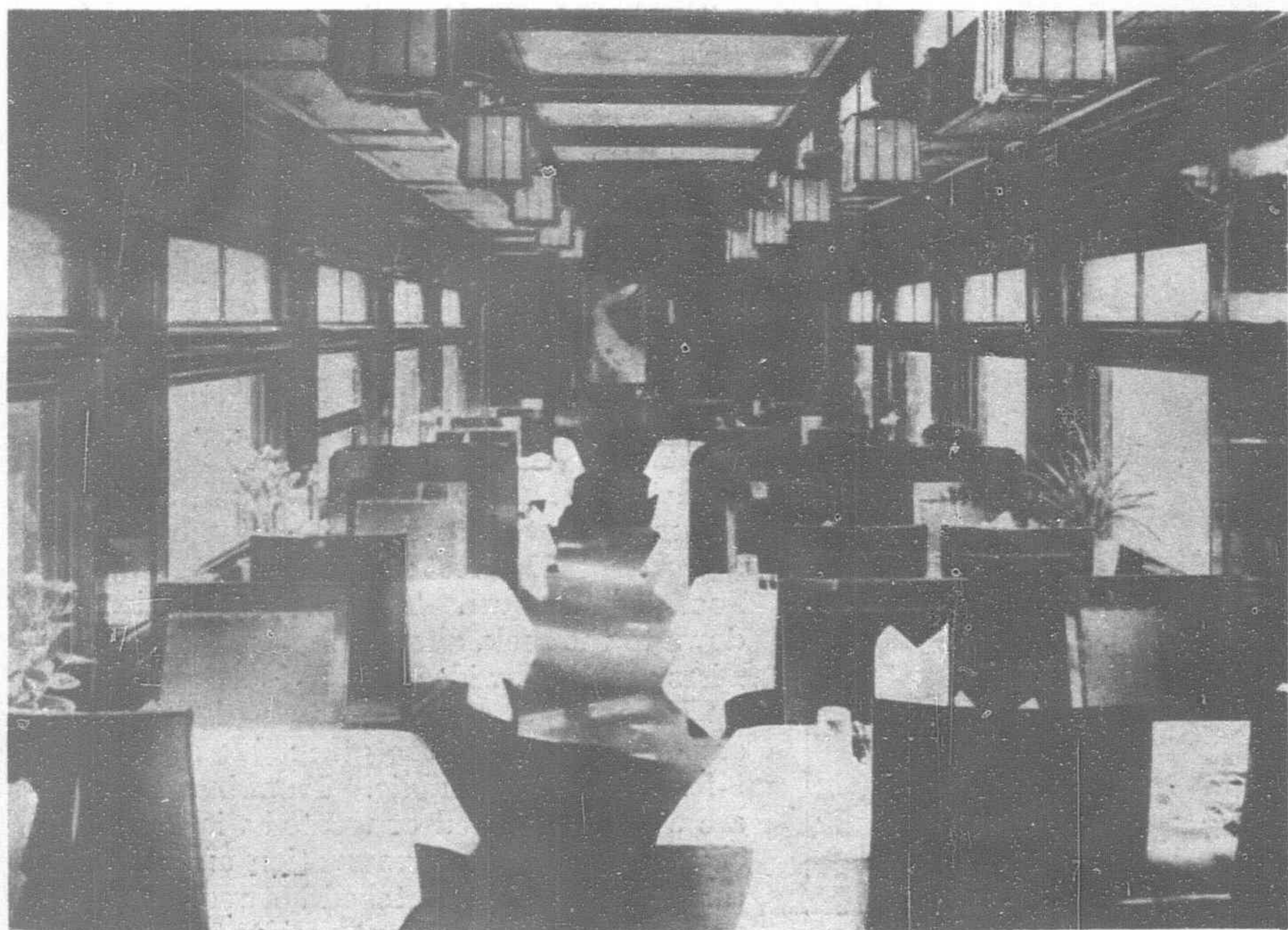
The new lines included in the 12 year program of the Chosen Government General will complete the strategic defenses of the northern frontier, and at the same time open these districts to colonization and industrial development. The Tomon Line completes the encirclement of the Kwanai wedge into the Tumen district: the Keizan Line terminating at Kaizanchin on the Yalu commands the Chientao District while the Mampochin Line terminating at Mampochin on the Yalu provides access to that region from the main Western Korea line. These three lines considered strategically, immeasurably strengthens Japan's position in the event of a crisis precipitated by the advance of Russia. The construction of the Tokai and the Keizan Lines will complete the circling of the entire coast line with military railways.

The Tomon Line

The Tomon Line, to connect Yuki with Dokanchin, following the valley of the Tumen River, is 97 miles in length. The estimated cost is Yen 17,083,000, including Yen : 14,550,000 of rolling stock and its completion is scheduled for 1931. The private line between Kainei and Dokanchin, 37 miles, was nationalized and opened to traffic in 1929. The maximum gradient is 1 in. 80, the minimum radius of curve 15 chains, main line rails are 75 lb. and 10-lb. rails for sidings. The line runs from Yuki, a port in the extreme north of Chosen, to Dokanchin, passing Agochi, Keigen, Kunju and Onjo. The tracts along the line are very rich in coal and timber. There is an extensive land left untilled which promises a large agricultural produce if properly managed. On the completion, timber from the vast virgin forests and agricultural products from the regions of Kanto and Konshun of East Manchuria may find their outlet through this line in the ports of North Chosen. Besides, when the Kikkai Line (connecting Kirin in North Manchuria with Kainei, Chosen) will be completed, the line will prove to be very important not only from an economical point of view but also from strategical stand point.

In 1925, the output of coal from the seven coal-mines in the Seishin district was as follows :—

			Tons
Kainei coal	...	...	18,000
Hogi	..	...	4,000
Koirin	..	...	16,000
Chikuho	..	...	2,000
Total	...	...	40,000



C. G. R. Dining Car

Estimated quantity of coal deposits in these regions is as follows:—

	<i>Tons</i>
Onjo coal-field ...	14,000,000
Kunju „ ...	27,000,000
Kaitakuto „ ...	33,000,000
Kokengen „ ...	50,000,000
Agochi „ ...	35,000,000
Total ...	160,000,000

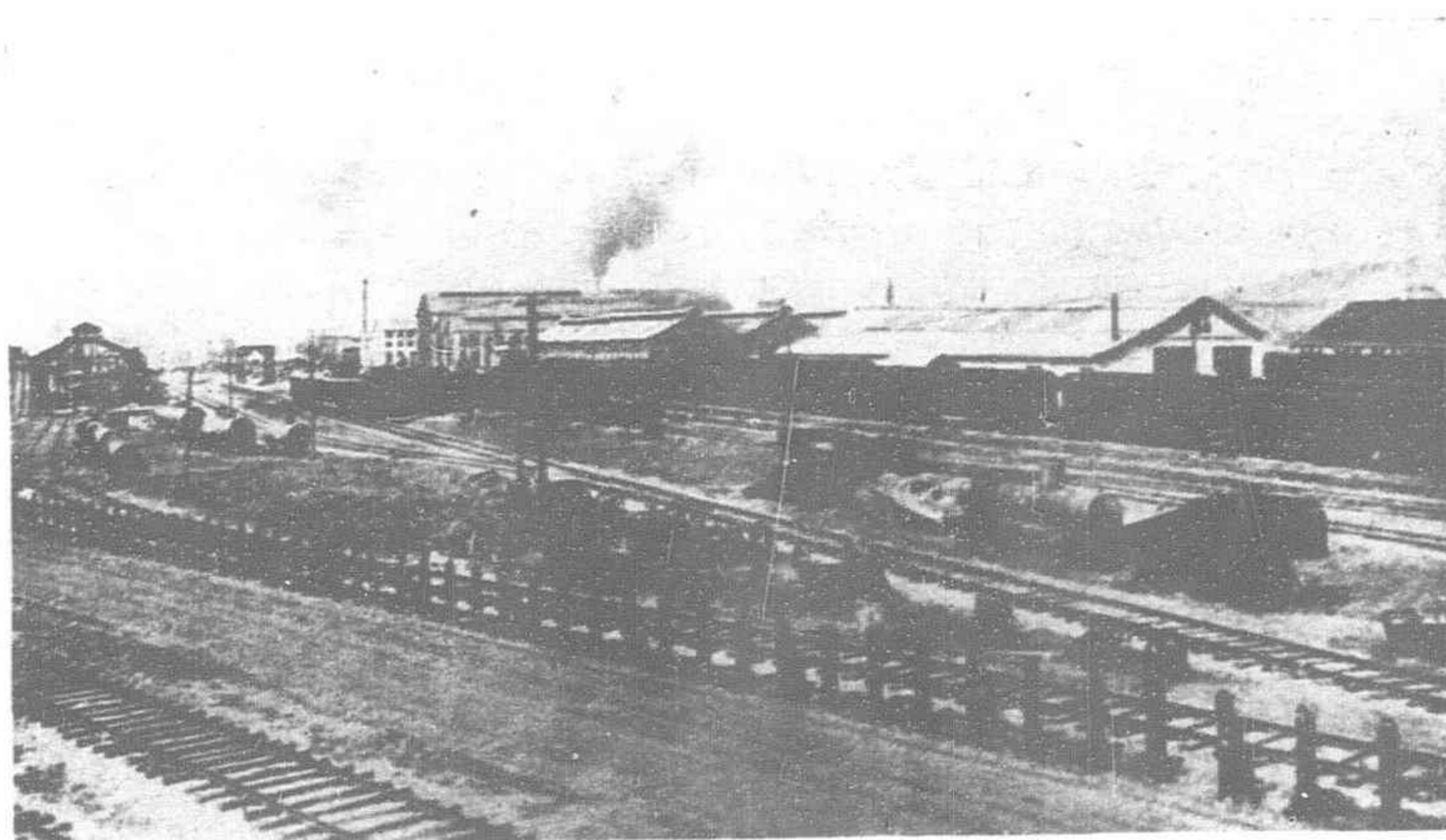
In addition, there are several coal-fields in Kanto and Konshun on the Chinese side. The quality of the coal is equal to or superior to the Ibaraki and Ube coals in Japan Proper. In the future it may contribute greatly to solve the coal question of Japan.

In 1925, 468,000 shakujime of timber was rafted. But the climatic conditions in these regions are very unfavorable for rafting, owing to the uncertainty of rains. In time of dryness, as well as in rainy season, rafting is almost impracticable, owing to insufficient water in the river or to an excess. It is roughly estimated that 300,000,000 shakujime is grown in the basin of the Tomon-Ko River in the lower Kainei, including the timber of the Chinese side opposite Kainei. The cheaper transportation by rail will enable the timber to be distributed to every part of Chosen, East Manchuria, and also to Japan.

There are 16 mines of gold, silver, copper, iron, etc. The principal ports are Yuki, Seishun, Rashin. In solving the questions relating to population, food, export, and import trade this railway has a very important rôle.



Engine Erecting Shop of the Keijo Workshops of the C.G.R.

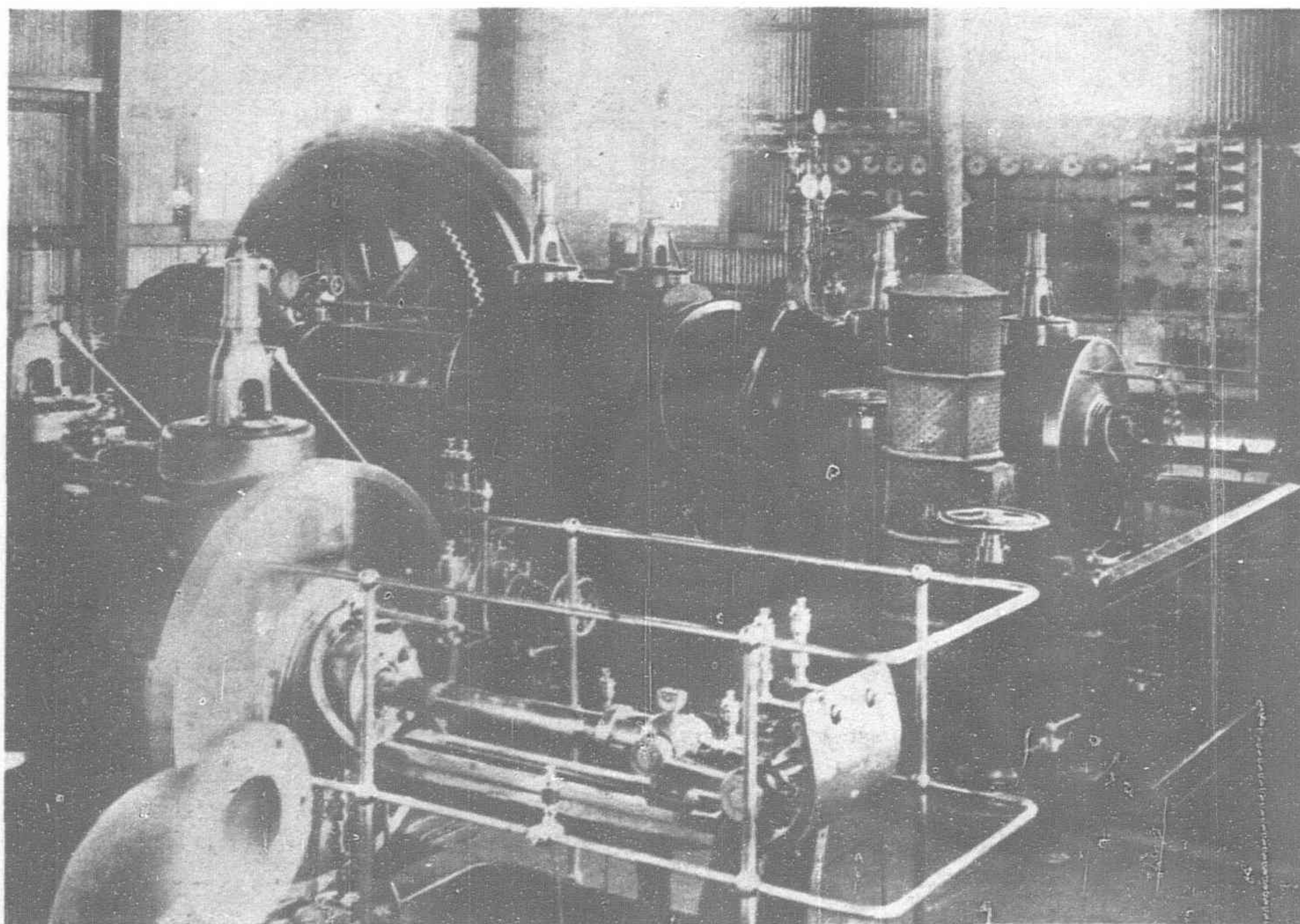


Keijo Workshops of the C.G.R.

The Construction of the Tomon-Ko Bridge.

Since the bridge over the river Tomon is completed, there are now two international bridges connecting Chosen with Manchuria; one at this point, and the other in the north-west over the Yalu River. These two rivers make a natural border line of 813 miles, separating Chosen from Manchuria and the Maritime Province of the Soviet Republic. The completion of an international bridge on the Yalu was an epoch-making event in connecting the Chosen railway with the Manchurian line. So the Tomon-Ko Bridge which provides direct connection between North Chosen and North-East Manchuria has an important rôle in the transportation and communication problem between those regions. The construction work on the Tomon Bridge was commenced on October 5, 1926, and completed on September 30, 1927. About 300,000 yen was spent on the wages of over 27,800 workmen (including 1,700 Chinese coolies). From November 15, through traffic was opened between railways on both sides of the river.

The steel plate girder bridge is of 14 spans, each 70-ft. long, with 13 piers 25-ft. high from the mean water, to the formation level, leaving a space of 11½ feet; which was the maximum flood ever known. The pier foundations reach down to the rock, about 15 ft. under water. The Piers are 21-ft. wide, 5-ft. 10 inches thick; on the up stream side a single track of 2-ft. 6 inches gauge was laid, on the other side a side-walk of 9-ft. wide for the public. Plankings and railings are wooden, painted or treated with Kumuhin, a chemical fluid for preservation and a wire net three feet high, is stretched between the sidewalk and the track to prevent accidents. Abutments and piers are constructed so as to fit, a plate girder of standard guage, if necessary.



Power House of the Keijo Workshops.

Keizan Line

The line stretches from Kisshu on the Kankyo Line to Keisanchin on the Yalu River is 88 miles long, estimated to cost 19,274,000 yen including 1,320,000 yen rolling stock, to be expended over a period of 11 years from 1927 to 1937. In 1933 the section between Kisshu and Gassui, 33 miles, will be opened. The maximum gradient is 1 in 30, the minimum radius of curve 10 chains. In the steep pass between Gassui and Ansho switchbacks are used.

The line is the only route that connects a vast forest in the upper Yalu with the Japan Sea and serves a very important rôle for the exploitation of the undeveloped regions along the line and also for the national and local defences of the border.

The estimated quantity of timber in this region is about 150,000,000 shakujime (not including that on the Chinese side). This line as well as the Tomon Line, chiefly aims to transport timber to the coast of North Chosen. There are five coalfields, two alluvial gold mines, and three mines of mica being worked. The area of the region is 406 sq. ri, containing 101,000 inhabitants; 248 persons per sq. mile.

Mampochin Line

This line of about 178 miles in length extends from Junsen on the Hei-Gen Line to Mampochin, estimated cost is 46,639,000 yen, including 2,670,000 yen of rolling stock, to be defrayed from 1927 in 12 successive years, ending in 1938. In 1932 the section between Junsen and Gunguri, 24 miles, will be opened. The remaining sections will be completed in order by 1938. As it is a standard gauge line, the maximum gradient is 1 in 80 and the minimum radius of curve 20 chains. In the section where the line crosses the steep pass of Kuken Pass, the maximum gradient is 1 in 30. In the section where the difficult work of tunnelling is to be avoided the switch-back system will be used and the radius of curves reduced to 10 chains. The weight of rails to be used is 75 lbs. and 60 lbs.

The line proceeds north from Junsen to Gunguri (near Kaisen) thence still northwards along the Seisen-ko River, passing Shinko and Kisen then crossing over the Kuken Pass, thence runs down the bank of the Tokuro-ko, a tributary of the Yalu, to Mampochin on the bank of the Yalu. The chief object of the line is the transport of coal, minerals, timber, and agricultural products from the interior and adjacent regions along the line. This line not only serves as an important route leading to central Manchuria, passing through Tsuka, promoting the development of the regions through which the line passes but also it serves as a means of national defence of the frontier.

The most important mineral found in those regions is coal. The total estimated quantity of coal deposits mostly anthracite, is 350,000,000 tons, located in the Junsen, Eizan, Tokusen, Kaisen, Neihen districts and covering an area of 100,000,000 tsubo. The coal outcrop extends for 40 miles. The anthracite coal is of the best quality, brilliant and pitch black in color. In burning, it gives off great heat with little flame and no coking. It is used in powder form or made into briquettes. The coal deposits are as follows:—

Districts	Estimate quantity of coal deposits	
	Tons	
Junsen coal-field	...	100,000,000
Kaisen	...	80,000,000
Neihen	...	20,000,000
Tokusen	...	150,000,000
Total	350,000,000

Timber:—The total estimated measure of timber of the Government and private forests along the line amounts to 130,000,000 shakujime, exclusive of that the Chinese side. Most trees are fully matured. The deciduous trees under the control of the jurisdiction of the Kokai branch office of the Forestry Bureau are 45,510,000 shakujime and amount to the two-thirds of the total accumulated quantities. Rafting is impracticable, consequently timber must be transported by railway. For solving the timber question of Japan this line as well as the Tomon and Keizanchin lines may prove very important. In 1925 the output of timber was 566,000 shakujime and 224,276,00 kin of fire wood and charcoal was produced.

In 1925, there were 29 mines of iron, 21 of gold, 10 of alluvial gold, 24 of graphite and 28 mines of gold, silver, lead and zinc, etc.

The Kiasen Iron mines produced over 1,300 tons of graphite. The density of population within the sphere influence of this line is not more than 523 per square mile.

Tokai Line

This is a line connecting Fusan with Genzan, running along the eastern coast of Chosen. The sections between Ampen and Hoko, 297 miles, Fuzanchin and Urusan, 44 miles, totaling 341 miles must be newly constructed. The narrow-gauge lines between Urusan and Hoko, 46 miles, and Taikyu and Keishu, 42 miles, must be improved to standard gauge so as to complete the second main line, traversing the peninsula from south to north. The principal purpose of this line is to convey the marine products, which hitherto experienced much inconvenience owing to the scarcity of good harbors, and also for the transit of the Tsusen coal, besides other mineral products and forest products of Hakutoren mountain, and at the same time to develop the local districts. Besides it aims to afford conveniences for sightseers to reach Kongosan, the Diamond Mountains. The cost of the new lines amounting to 63,000,000 yen, of which 5,115,000 yen is for rolling stock, is to be defrayed from 1927 in 12 successive years, ending in 1938. The maximum gradient is 1 in 80, the minimum radius of curve 20 chains. The section where tunnelling and other difficult works are avoided, the radius is reduced to 10 chains. The weight of rails are the same as those used in other lines.

The places which the line passes, are Ampen on the Kei-Gi Line, Tsusen, Kojo, Joyo, Koryo, Sanchoku, Uruchin, Eitoku, Gei-nichi, Keishu, Urusan and Torai, extending over 12 districts. It connects with the Kei-Fu Line at Fuzanchin. The area in the sphere of influence of the line contains 730 square ri which is equivalent to 32 per cent of Kyushu or 63 per cent of Shikoku in Japan. The maritime districts, extending over 200 miles have no good harbors except Fusan and Genzan. The steam boats of the Chosen Yusen Kaisha call at the various ports, but having no good harbor accommodation, the anchorage is not easy.

According to the investigation on October 1, 1925, the population of the east-coast districts amounted to 992,000 exclusive of Genzan and Fusan; the average density is about 1,360 per square ri. An entire area of arable land contains 157,000 chobu of which rice fields in 79,000 chobu and dry land 78,000 chobu.

Timber comes from Hakutoren mountain and the vicinity, and it is estimated that 15,000,000 shakujime can be carried out.

Forest products:

Timber	...	432,000 shakujime.
Charcoal,	...	1,024,000 kan
Fire-wood,	...	2,344,870,000 kin
Chosen paper,	...	7,000 bundles.

The coasts abound with fish of many kinds, as both streams of cold current from north and warm current from south flow near the coasts. There are many fishing ports along the coasts.

Coal is mined in Tsusen, Sanchoku, Shotasu, Kensen, Neikai, Geinichi, and Choki. Kinsen and Shotatsu are anthracite.

Gold, silver, graphite, zinc, arsenic, etc., are found. Of 89 mines permitted to work, only two or three are working.

Mineral products mined in 1925:

Coal	...	7,000 tons.
Ores	...	114,000 kan.

Besides, this line forms one of the two important main lines which run through the peninsula from south to north, connecting the North and South Kankyodo with Fusan. The line is about 20 miles shorter to reach there than by the Kei-Fu and Kei-Gen Lines. Most passengers and freight will take this line, and relieve the congestion on the Kei-Fu and Kei-Gen Lines.

Keizen Line (156 miles)

The Line runs 132 miles from Shinshu on the Keinan Line of the Chosen Railway Co. to Zenshu passing Kato, Koyo, Juntan, Kokujo, Inson, Nangen and Jinjitsu. When the time comes to change the narrow gauge to standard and to connect the Konan Line, it may continue to Kunsan, an important seaport on the western coast of the Peninsula. A branch line from Inson runs west joining the Konan Line of the Government Railway at Tanyo, 24 miles, through which it connects with Moppo, an important

(Continued on page 638).



The Imperial Government Steel Works at Yawata, Japan

The Iron and Steel Industry of Japan

By SUSUMU HATTORI, *Kogakuhakushi*, President of the Iron and Steel Industry of Japan

(In this article, the First Period is omitted.)

The Second Period.—Western civilization that began to flow into the midst of our national life, subsequent to the Restoration of 1868, gave rise to new activity in civil engineering, architecture and shipbuilding. Iron for railways, bridges and other constructional purposes came into keen demand; this situation gave birth to not a few enterprises in the iron and steel industry. At Kamaish Sen-ninzan, Kamiteoka and other iron mines efforts were often made by both the Government and private parties to develop the industry. All these attempts however, met with disastrous results largely for the following reasons: first, through lack of preliminary inquiry as to the ore and fuels, such as coal and charcoal; second, because of inadequate equipment coupled with inexperienced management; third, because the market for iron and steel in those days, though steady in growth, had not reached the stage as to make such undertakings economical. Such being the case, the employment of modern methods of iron and steel making was necessarily retarded. It is worthy of note, however that the country's demand for the metal had in 1890 or thereabouts reached the total of 100,000 tons annually or 4,000,000 yen in value.

In view of the increasing demand for iron and steel, and its relation to the matter of national defence which had come to claim much attention on all sides, the Government called into being the Commission of Inquiry into the Steel Industry, which was ordered to make investigations with a view to establishing steel works under Government management. As a result, it was decided in the year 1897 to construct in the town of Yawata, in Fukuoka Prefecture, steel works on modern lines and on quite an ambitious scale. It may be noted at this point that the country's demand for iron and steel at that time was 65,000 tons of pig iron and 220,000 tons of steel annually, representing altogether a value of ¥10,000,000, of which not more than ten per cent was met by home production, while the rest had to be imported from Europe or America.

The period of thirty years following the new era of Meiji, which marks the Second Period in the history of our iron and steel industry, saw such activity as had never been seen before. Blast furnaces of modern type were installed at Kamaishi; Military arsenals were constructed at both Tokyo and Osaka, while the Navy built their arsenals at Kure and Yokosuka. Smelting, forging and casting of iron on modern lines began to appear on many sides in response to the demand of the times, but the steel works above mentioned were chiefly engaged in the making of special steel of high order, and our production in commercial steel fell far short of requirements. It was not until the Imperial Steel Works at Yawata had been brought into existence that the situation was met more or less adequately.

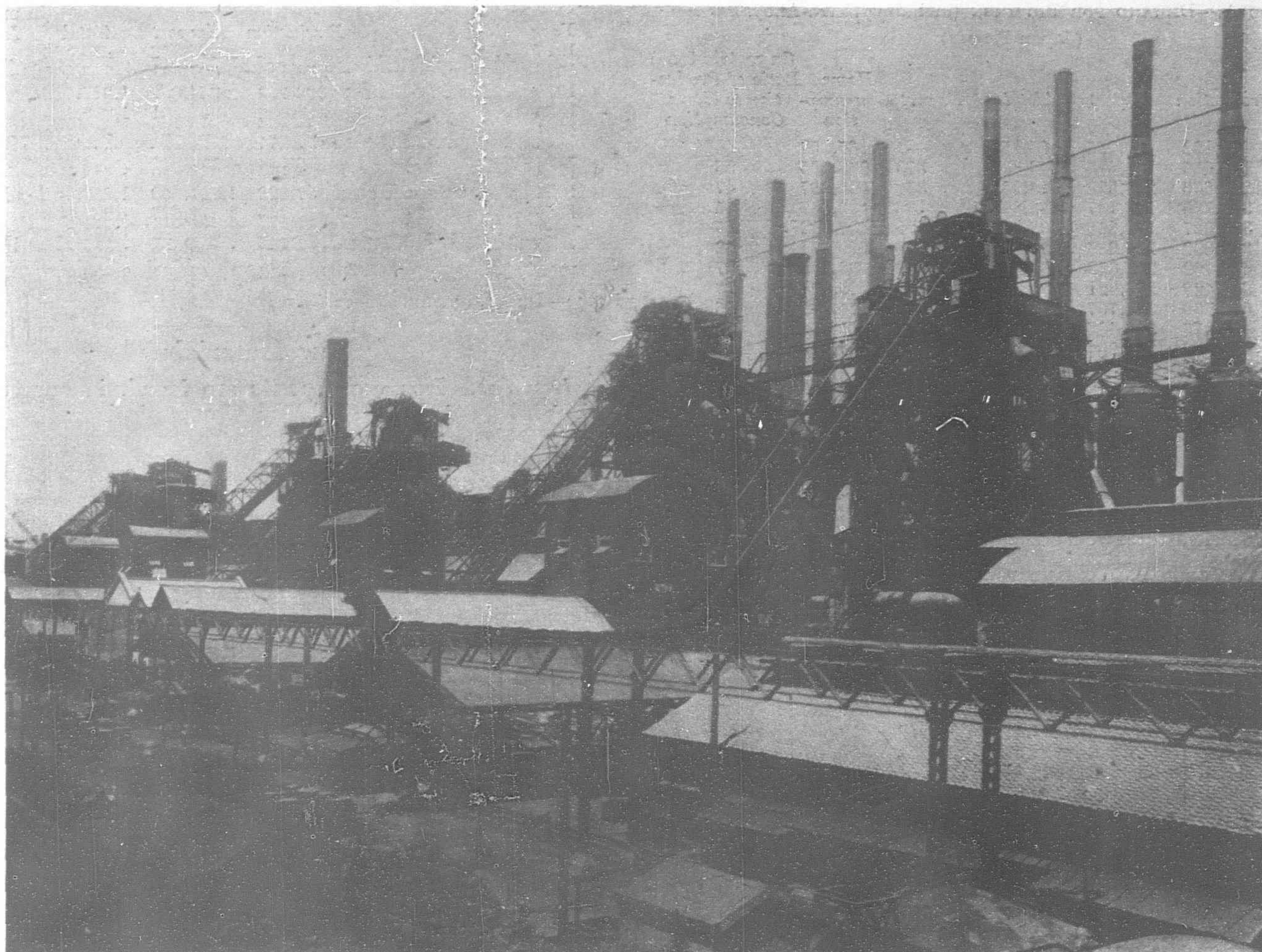
The Yawata Steel Works have since the beginning, been enlarged no less than three times, owing to the growing needs of the Country. The original manufacturing capacity of these works was 60,000 tons of steel products per year, afterwards increased to 90,000 tons, and this was doubled 10 years later by what is known as the First Extension Program. Through another extension program which followed soon afterwards, the capacity was advanced to 350,000 tons. By the Third Extension Program the output will be increased to 750,000 tons, and this figure will be increased to one million before long.

The Third Period.—The establishment of the Imperial Steel Works at Yawata virtually marks the beginning of the Third Period in the history of the industry in our country, but the difficulties met with in the early days of these Works in technical and economic matters were so discouraging that it was even thought doubtful at times whether the steel industry would ever be possible for us people of Japan. In consequence, many private works began to spring up throughout the country, and signs of industrial development became manifest.

The demand for pig iron in Japan



General View of the Kenjiho Iron and Steel Works in Korea of the Mitsubishi Iron and Steel Co., Ltd.

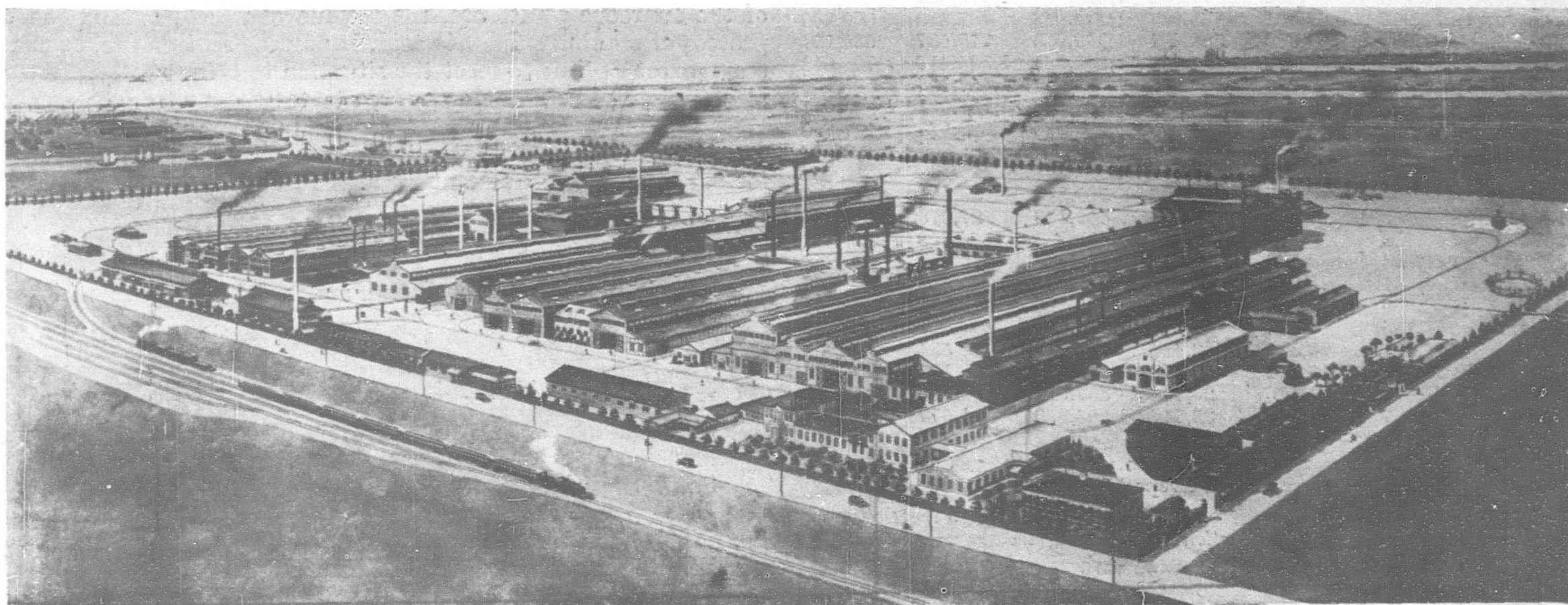


Blast Furnaces of the Yawata Steel Works

Proper in 1906 was 248,898 tons. In 1928 this had risen to 1,820,000 tons, of which 1,110,000 tons was produced at home and 709,900 tons imported. Of this, only 5,000 tons were exported. The demand for steel products during the same period, was 417,511 tons in 1906, increasing to 2,425,160 tons in 1928, of which 1,597,140 tons were produced at home and 828,020 tons imported. Home consumption accounted for 2,245,512 tons while 179,648 tons were exported.

To the figures above must be added approximately 400,000 tons of foundry pig iron, which means that at present the entire demand of our country for iron and steel may be estimated at 2,500,000 tons per year. Naturally the increase in the demand

for iron and steel products cannot continue at the same rate as in the past, but I am prepared to venture the statement that consumption will further grow until the *per capita* rate approaches nearer to that of Europe and America. This in spite of the fact that conditions of life in Japan are still essentially different from those prevailing in the West. I have also reason to state that our demand for these metals will within a few years reach the three million ton mark. In explaining our situation as regards the future of the industry which is in such a vigorous state of growth, it will be well to describe the existing conditions of resources with reference to the requisite raw materials, especially iron ore and coal.



The Sumitomo Steel Works at Osaka

TABLE A.—DEMAND FOR PIG IRON (including Ferro-Alloys)
(Japan Proper)

Year	Production	Import	Total	Export	Home Consumption	Ratio of Production to Home Consumption
1896	26,122	39,035	65,157	—	65,157	40%
1906	145,455	103,443	248,898	373	248,525	58
1913	242,676	273,309	515,985	358	515,627	47
1914	301,726	172,137	473,863	186	473,677	64
1915	320,627	172,685	493,312	400	492,912	65
1916	391,892	237,655	629,547	6	629,541	62
1917	462,792	235,082	697,874	3,077	694,795	67
1918	606,428	226,321	832,749	6,822	825,927	73
1919	612,609	348,707	961,316	17,034	944,282	65
1920	529,875	390,466	920,341	9,785	910,556	58
1921	480,300	276,284	756,584	5,768	950,816	64
1922	559,310	409,606	968,916	5,282	963,634	58
1923	610,442	1,040,193	5,231	1,034,962	1,034,962	59
1924	598,405	520,122	1,118,527	7,270	1,111,257	54
1925	696,111	402,568	1,098,679	6,503	1,092,176	64
1926	821,832	508,412	1,330,244	4,086	1,325,558	62
1927	911,258	580,670	1,491,928	4,325	1,487,603	61
*1928	1,111,000	709,000	1,820,000	5,000	1,815,000	61

Note:—*Estimate.

Imports include those from colonies. Exports include those to colonies.

TABLE B.—DEMAND FOR STEEL PRODUCTS.
(Japan Proper)

Year	Production	Import	Total	Export	Home Consumption	Ratio of Production to Home Consumption
1896	1,192	220,757	221,949	—	221,949	5%
1906	69,375	348,136	417,511	4,942	412,569	16
1913	254,952	527,626	782,578	31,421	751,157	34
1914	282,516	395,552	678,068	29,081	648,987	44
1915	342,870	236,463	579,333	28,869	550,464	62
1916	381,221	442,448	823,669	26,423	797,246	48
1917	513,445	675,204	1,188,649	53,803	1,134,846	45
1918	539,637	656,467	1,196,104	66,329	1,129,775	48
1919	552,601	724,991	1,277,592	108,445	1,169,147	47
1920	537,461	1,039,418	1,576,879	97,382	1,479,497	36
1921	561,829	646,801	1,208,630	84,731	1,123,899	50
1922	662,092	1,100,838	1,762,930	83,298	1,679,632	39
1923	753,304	799,177	1,552,481	97,853	1,454,628	52
1924	829,115	1,154,402	1,983,512	91,095	1,892,417	44
1925	1,018,221	532,891	1,551,112	107,505	1,443,607	71
1926	1,244,772	924,731	2,169,503	120,389	2,049,114	61
1927	1,400,416	814,264	2,214,680	155,743	2,058,937	68
1928	1,597,140	828,020	2,425,160	179,648	2,245,512	71

Note:—Imports include those from colonies. Exports include those to colonies.

TABLE C.—ACTUAL CONSUMPTION OF RAW MATERIAL BY LEADING IRON WORKS.

Year	Iron Ore	Manganese Ore	Limestone	Coking Coal	Other Coal	Coke
1918	1,065,930	136,973	373,157	1,184,667	1,182,562	820,010
1919	1,097,925	70,151	431,523	1,691,624	1,014,839	888,761
1920	1,248,146	48,826	533,472	1,604,446	1,269,770	818,032
1921	1,074,850	46,625	506,350	1,053,281	1,285,749	784,396
1922	1,181,718	39,442	477,253	1,366,221	1,078,047	680,742
1923	1,014,202	49,061	368,987	1,231,022	707,303	660,200
1924	991,653	64,332	368,801	1,339,633	779,637	636,124
1925	1,215,543	65,423	457,605	1,380,971	1,334,417	764,642
1926	1,437,395	76,096	495,652	1,438,409	1,367,135	881,156
1927	1,585,475	84,568	616,632	1,712,558	1,467,051	1,041,051
1928	1,833,690	107,710	635,109	1,798,000	1,599,621	1,207,720
Year	Pig Iron	Ferro Alloys	Slag	Scrap	Iron Sand	Charcoal
1918	492,702	8,197	34,725	560,313	33,981	118,606
1919	474,058	7,225	25,224	402,132	27,878	257,799
1920	500,720	26,051	25,243	493,190	6,708	167,962
1921	541,528	8,687	654	451,427	3,483	25,248
1922	604,331	13,788	1,219	454,614	580	7,545
1923	650,056	15,590	1,662	430,308	152	3,113
1924	731,706	14,563	1,944	494,352	466	3,380
1925	973,271	13,510	2,454	564,999	584	2,660
1926	1,033,977	15,851	17,549	659,295	185	1,664
1927	1,062,040	21,396	24,350	859,014	107	1,759
1928	1,070,177	18,459	32,547	1,068,359	1,577	1,887

TABLE D.—DEMAND FOR IRON ORE.
(Japan Proper)

Year	Production	Import	Total	Iron Sand
1913	153,101	422,316	575,417	18,600
1914	121,636	460,912	582,548	14,784
1915	118,955	510,766	629,721	17,200
1916	139,953	470,016	609,969	18,902

Year	Production	Import	Total	(in metric tons) Iron Sand
1917	267,594	417,788	685,382	34,035
1918	378,114	597,541	975,655	37,948
1919	362,949	954,607	1,317,556	27,523
1920	314,858	994,901	1,309,759	9,134
1921	86,977	768,597	855,574	6,878
1922	39,744	908,337	948,081	6,067
1923	55,174	988,650	1,043,824	3,799
1924	57,922	1,201,859	1,259,781	3,118
1925	75,765	1,211,577	1,287,342	3,459
1926	130,420	891,822	1,022,242	4,469
1927	159,005	1,106,252	1,265,257	12,301
1928	157,706	1,842,364	2,000,070	1,869

Note:—Imports include those from colonies.

Raw Materials

Iron Ore.—Iron ore deposits are found, in our country, in regions where rocks of Archaean Groups lie in contact with the igneous rocks, which as a rule are marked by sharp and mountainous features, and are thus difficult of access. Their distribution extends from the island of Hokkaido in the north to Hondo or the main island, and farther to the islands of Shikoku and Kyushu in the south, though none of these deposits are of any remarkable areas. The deposit at Kamaishi, the largest in the country, runs out to a length of six kilometers with a breadth of one kilometer and the thickness reaching at its maximum 20 meters or thereabout. This deposit, at present estimated to be 50,000,000 tons, consists mostly of hard magnetite difficult to melt.

The largest deposit next to Kamaishi lies in the province of Echigo, over the districts from Akatani to Mount Awagatake, owned by the Imperial Steel Works of Yawata, which is estimated at 4,000,000 tons. The ore consists, for the most part, of hematite and magnetite, not difficult to melt. Mention may be next made of the following deposits:—micasious iron at Mount Sen-nin; magnetite and micasious irons at Kuriki; magnetite at Naka-Kosaka and Ishikasa; hematite in Tosa province; magnetite in Yamato province, etc. These deposits, representing the principal ones of the country, in no case show a quantity more than 1,000,000 tons. The regions about Abuta and Wakkatasapp, both of Hokkaido, are credited with big iron deposits, running up to 4,000,000 tons approximately, though the ore is too brittle and inferior in quality. In brief, of all iron deposits in our country, so far as they have been prospected, what is available for practical use is estimated to be 80,000,000 tons. Analysis of principal iron ores used in Japan is given under Table F. In addition to the massive ores accounted for above, there is the iron sand.

Prior to the adoption in Japan of modern smelting methods which demand the massive ore, iron sand was used almost exclusively as raw material. While our iron sand deposits are thought to run up into billions of tons, the sand possesses the serious disadvantage in that it can not be used on a large scale for modern blast furnace work, consequently its practical possibilities still remain a problem.

Reference to Iron Sand Deposits omitted.—Ed.

In addition, there is found in our country abundant supply of the cupreous pyrite ore, the residue of which, obtained in the process of making sulphuric acid, is used as an iron ore, as one of our modest devices to meet the situation in this country. We are also studying low grade ores so as to turn them to good account. With these factors at work, we are still unable to meet the growing demand for iron and steel and are forced to look beyond the sea for our supplies. Abundant resources in China, Korea and South Seas islands, for the reason of their geographical positions, are drawn upon for our purpose, as shown by the import figures given in Table D.

The iron deposits in Japan and neighboring countries are estimated as follows:

	Tons
Japan	80,000,000
Korea	30,000,000
China (along the river Yangtze)	150,000,000
Manchuria	300,000,000
South Sea islands	100,000,000

Coal.—The quantity and quality of the coal which any country possesses is a more important determining factor in its iron and steel industry than, perhaps, the presence of the ore itself.

The coal of Japan which belongs to the Tertiary period of the Cainozoic era is of a formation far later than the coal found on the

European continent which belongs to the Carboniferous period of the poleozoic era. Ours is for the most part bituminous coal, containing excessive impurities as well as volatile matter and ash. Lacking also binding power, this coal in itself is unsuitable for the purpose of making good blast furnace coke, though quite satisfactory for gas producers and as fuel for boilers and other heating purposes. If 70 per cent of this coal, for instance some Kyushu coal such as Futase grade, or Hokkaido coal as of Yubari grade, is mixed with 30 per cent of a coal of good caking power and less volatile matter, such as Kai-ping, Penhsi-hu or Shan-tung coal of China, or other similar coal and put through the proper process of washing and stamping, we obtain a coke, which, though inferior to such as is used for blast furnaces abroad, or at the Ta-yeh works in China, is still quite good enough for our purpose at present.

The coke made from such composite coal, in comparison, for instance, with the Ping-shang coal in use at the Ta-yeh works of China, shows considerable inferiority in point of hardness or in compression test. That is, while the Ping-shang coke is capable of 180 kg/sq. cm. the coke made at Yawata from the composite coal shows but 89 kg/sq. cm. or almost half that of the former. Although it is obvious that we can advance the hardness and improve the quality of such product by giving a greater percentage of coal of more binding power, it is still an open economic question what is really the most desirable proportion of mixture from the point of view of production cost.

The rate of coke consumption at present is about 110 per cent in the case of the basic pig at Yawata Works. Supposing the quantity of coal required for making one ton of steel product is something like 3.5 tons, accounting as far back as the pig iron making, we shall then need 7,000,000 tons of coal annually in order to produce 2,000,000 tons of steel products. Assuming therefore that 1,000,000 tons of higher caking power are to be imported from abroad, the balance of 6,000,000 tons would need to be taken care of by the native product and this represents but 17 per cent of the present coal output of the country which is some 35,000,000 tons annually. As for the million tons of coal to be sought abroad, we may well depend on our neighbor China. In this connection, it may be of interest to see what some of the principal mines in China are capable of, which is shown in figures below :

Name of coal mine or district	Deposit content	Present output (year)
Kai-ping	500,000,000 tons	4,500,000 tons
Penhsi-hu	200,000,000 ..	500,000 ..
Shan-tung	300,000,000 ..	1,000,000 ..

Equipment of Principal Iron and Steel Works

We proceed now to give below a general description of the equipment at our principal iron and steel works.

Blast Furnace.—(Only those with capacity of 100 tons per day and upward).

Name of Works	Capacity (in tons)							Yearly product (in tons)
	350	300	200	180	150	120	100	
I.S.W. (Yawata)	2	1	3					651,000
" (Tobata)		1	1					186,000
Kamaishi S.W.			2					76,000
Wanishi Works						3	1	110,000
Asano S.W. (Tsurumi) ..					1			55,000
Mitsubishi S.W. (Kenjiho)				2				146,000

As for the number of furnaces with a capacity of less than 100 tons a day, there are 18 in all, the largest being at Kamaishi which is credited with 60 tons per day output. From these works we get 130,000 tons of product each year which means therefore that the entire annual production from blast furnaces combined is 1,350,000 tons.

Open Hearths.—(Only those with capacity of 25 tons, each tap, or upward).

Name of Works	Capacity (in tons)				
	200	60	50	30	25
	(Talbot)				
I.S.W. (Yawata)	2	11	6		12
Kamaishi S.W.					3
Nippon Kokan				2	7
Kawasaki Zosen (Fukiai) ..					8
" " (Hyogo)					2
Kobe S.W.				1	1
Sumitomo Shindo-Kokan (Amagasaki)					3
Asano Kokura S.W.					3
Fuji S.W.					1
Osaka Seitetsu					3
Kyushu S.W.					3
Asano (Tsurumi)					2
Mitsubishi Seitetsu (Kenjiho)					3

The above represents an aggregate output of 2,000,000 tons of ingot annually, and accounts only for basic open hearths of 25 tons and upward, all of which are used for making ordinary steel product. Two Bessemer converters at the Yawata Works, each of 10 tons, are excluded, since they have recently been put out of commission. Small open hearths, crucible furnaces, electric furnaces, baby Bessemer, etc, have all been left out of account, in view of the special character of work for which they are employed. Upon such a basis we may now estimate the present demand for special steel product as 100,000 tons per year.

Under present conditions, our demand for steel product doubles every ten years, as shown above, and we may estimate our demand at present to be 2,000,000 tons per year. This amount may be classified, on the basis of the actual returns for 1927-28, into the following items with their respective percentages :—

ROLLING MILLS.		
Rolling Mills	Name of Works	Maximum Capacity (Yearly)
Blooming mills	I.S.W. (Yawata)	1,770,000 (by 7 mills)
	Mitsubishi Seitetsu (Kenjiho) ..	300,000 (by 1 mill)
	Total	2,070,000
Large bar mills	I.S.W. (Yawata)	450,000
	Mitsubishi Seitetsu (Kenjiho) ..	90,000
	Kyushu Seiko (Yawata)	30,000
	Total	570,000
Middle bar mills	I.S.W. (Yawata)	125,000
	Tokai Kogio (Wakamatsu)	30,000
	Kawasaki Zosen (Hiogo)	30,000
	Kobe Seiko (Kobe)	15,000
	Sumitomo Seiko (Osaka)	30,000
	Nihon Kokan (Tsurumi)	49,000
	Total	279,000
	I.S.W. (Yawata)	180,000
Small bar mills	Kawasaki Zosen (Hiogo)	20,000
	Kobe Seiko (Kobe)	10,000
	Osaka Seitetsu (Osaka)	50,000
	Nihon Kokan (Tsurumi)	50,000
	Kamaishi Seitetsu	40,000
	Asano Seiko (Kokura)	30,000
	Total	380,000
Wire rod mills	I.S.W. (Yawata)	60,000
	Asano Seiko (Kokura)	50,000
	Kobe Seiko (Kobe)	50,000
	Total	160,000
Heavy plate mills	I.S.W. (Yawata)	200,000
	Mitsubishi Seitetsu (Kenjiho) ..	60,000
	Kawasaki Zosen (Fukiai)	60,000
	Asano Seitetsu (Tsurumi)	60,000
	Total	380,000
Light plate mills	I.S.W. (Yawata)	70,000
	Kyushu Seiko (Yawata)	30,000
	Tokai Kogio (Wakamatsu)	25,000
	Total	125,000
Sheet mills	I.S.W. (Yawata)	25,000
	Kawasaki Zosen (Fukiai)	15,000
	Osaka Teppan (Osaka)	15,000
	Total	55,000
Tin plate mills	I.S.W. (Yawata)	20,000
Universal mills	I.S.W. (Yawata)	48,000
Tube mills	Nihon Kokan (Tsurumi)	69,000
	Sumitomo Shindokokan (Amagasaki)	25,000
Total		94,000

Large bars and shapes 4½ inches and upward in diameter or width (including rails of more than 45 lbs)

Middle bars and shapes 1½ inches—4 inches in diameter and those below 4 in. in width (including light rails)

Small bars and shapes below 1½ in. in diameter and those below 2 in. width

Heavy plates (upward of ¼ in. or 6 m.m.)

Light plates (upward of No 22 or below 6 m.m.)

Sheets (below No 22 or 0.7 m.m., and including tin plates)

Wire rods (including wire, cords, nails)

Tubes

Ribbon

21%

12.5

21.5

9

5

16.5

8.5

5

1

55

30.5

(Reference to iron sand smelting in Mr. Hattori's paper is omitted for separate treatment)

With their loans unredeemed, the entire property of all the pig iron and steel manufacturing companies of Japan is assessed at some Y.146,000,000, and the proposed fusion scheme of the iron and steel industry, under the semi-Governmental management, will be realized on the basis of this valuation.

The assets of all companies throughout Japan, which have been investigated by the Government, are as follows:—

A TABLE.

Company	Paid-up capital	Current value (Unit Y.1,000)	Loan	Total of loan and assessed capital
Toyo Steel Co.	30,670	6,080	—	6,080
Japan Steel Pipe Co. ..	15,225	2,200	16,168	18,368
Osaka Steel Co.	1,060	1,060	—	1,060
Oshima Steel Co.	5,078	—	754	754
Fuji Steel Co.	3,100	—	500	500
Tokai Steel Co.	2,250	800	450	1,250
Mitsubishi Iron Co. ..	25,000	5,000	1,900	6,900
Sumitomo Steel Co. ..	9,000	3,000	2,069	5,069
Tokyo Steel Co.	400	—	2,558	2,958
Kokura Steel Co.	6,300	2,090	2,581	4,671
Kamaishi Mining Co. ..	20,000	4,000	1,745	5,745
Tokuyama Steel Plate Co. ..	2,500	2,000	500	2,500
Total	120,813	26,820	29,222	50,052

B TABLE.

Name	Paid-up Capital	Loans	Total
Japan Steel Co.	12,000	1,800	13,800
Kobe Steel Co.	8,000	8,000	16,000
Mitsubishi Dockyard ..	10,000	—	—
Kawasaki Dockyard ..	20,000	20,000	40,000
Sumitomo Copper Mining Co. ..	7,200	—	7,200
Asano Dockyard	5,000	4,000	9,000
Total	62,200	33,800	96,000

(Table A shows the assets of each company engaged only in steel and iron manufacturing, while Table B shows the condition of the companies which are carrying on the steel and iron business as a side line. The total of the two tables is Y.146,000,000, and the amalgamation is planned to be made on this basis).

Average Annual Turnout

The average annual turnout of steel of these companies is estimated some 1,000,000 tons, and this means a capital of Y.146 is producing one ton of steel annually. However, the Yawata Iron Works is manufacturing one ton of steel for each Y.177 of its capital annually, and the total assets of the Yawata Works are estimated as nearly equal to the total value of these private concerns. Hence the proposed fusion of the steel and iron industry will be made on the basis of some Y.330,000,000 capital.

The rapid development of the industrial rationalization after the gold export ban was lifted, has made advisable the quick realization of such a scheme. The plan is now within the bounds of possibility.

The executive committee of the Iron and Steel Conference formed by the 20 private companies related in the merger, is now making preparations for the combination.

Chosen Government Railways

(Continued from page 633).

port on the south-western coast. Thus the Line connects Moppo Kunsan and Fusan traversing through South Keisho, North and South Zenra Provinces and serves for the transit of the vast marine products of the adjacent sea known as Tatokai which means the sea of many islands.

The cost of construction amounts to 28,145,000 yen, of which 2,340,000 yen of rolling stock is included, to be defrayed from 1927 to 1934. In 1929 Bankeiko bridge on the purchased line from the Zenhoku Railway Co., will be reconstructed and the track changed to standard guage and by the next year the section between Riri and Sensen 13 miles, will be opened. Thenceforth the work starting at both ends, Tanyo and Shinsh will be completed by 1934, according to program. The maximum gradient is 1 in 40, the minimum radius of curve 13 chains which may be reduced to 10 chains, if necessary.

There are 34 mines of gold, silver and others.

The new line after completion will give new life and activity to every industry and increase production immensely and wealth of the province through which it passes.

Development of Modern Banks in China

(Continued from page 610).

Taking into account the very short lapse of time during which the modern banks have been enabled to arise—and considering also the very troublesome times politically, during which they had to enforce their early development, it will probably be conceded that the results achieved are at least noteworthy.

These in brief is the story of Chinese banking—a science and trade which has forced its way to the front in the course of thousands of years and whose career can hardly be related in the course of a short hour.

There is one other point which requires mention, namely the rise of modern Chinese banks in its relationship to foreign friendship and local competition with foreign banks. It goes without saying that direct contact between Chinese banks and their foreign correspondent abroad is bound to cement lasting friendship and bring China and foreign nations much closer together. Often finance and trade have succeeded in accomplishing a difficult object which could not have been reached through means of diplomacy. As regards our relationship with locally established foreign banks I have great pleasure in not only stating, but clearly proving, that there is perfect harmony and close co-operation, as is evidenced by the recent creation of an Association of Shanghai Banks, being a combine of the Foreign Exchange Banks and the Chinese Bankers and Native Bankers Associations.

Personally I see very rosy for the future of Chinese banking on modern lines, and I hope that my sincere optimism will be fully justified.

Problems of the Formosan Sugar Industry

(Continued from page 614).

According to the Association of Sugar Manufacturers, the average cost of production of Java sugar the last three years has been Y.6.90 a picul, while that in Japan (Formosa) was Y.10.80 per picul. Compared with the lowest cost of Formosan sugar Y.8.80, the difference is Y.2.50 a picul in favor of Java. The cost of Java sugar is likely to decrease continuously due to improvements in cultivation. A comparison of costs the last three years follows:—

Year	Javan Sugar	Formosan Sugar
1926-27	Y.6.76	Y.10.70
1927-28	5.65	12.06
1928-29	5.59	9.87
Average	Y.5.94	Y.10.87

The only means for improving cultivation in Formosa are:

1. Improvement of seedlings and the methods of growing them.
2. Better fertilization.
3. Utilization of land and improvement of water distribution.

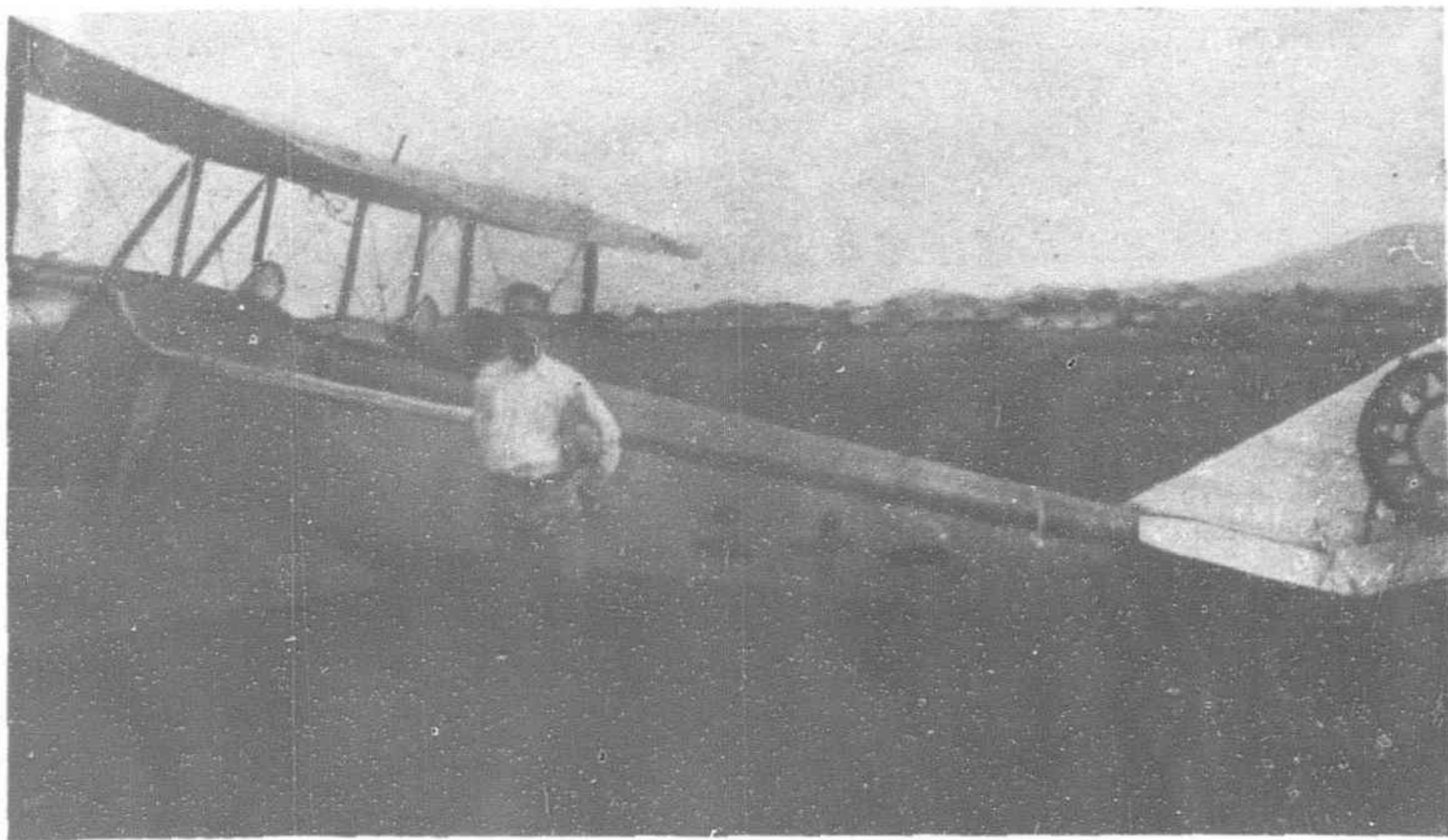
At the same time the process of manufacturing must be improved, so that the extraction will be increased. At present 55 to 60 per cent of the total cost is raw material, so that prices cannot be lowered unless the principal item is cheaper. But lowering the price of cane is difficult, because negotiations have to be made with farmers who are hard to handle. In Formosa, the farmers' problems are more troublesome than in Japan, as the question of nationality is involved in the questions of labor and capital.

Oilfield in Manchuria

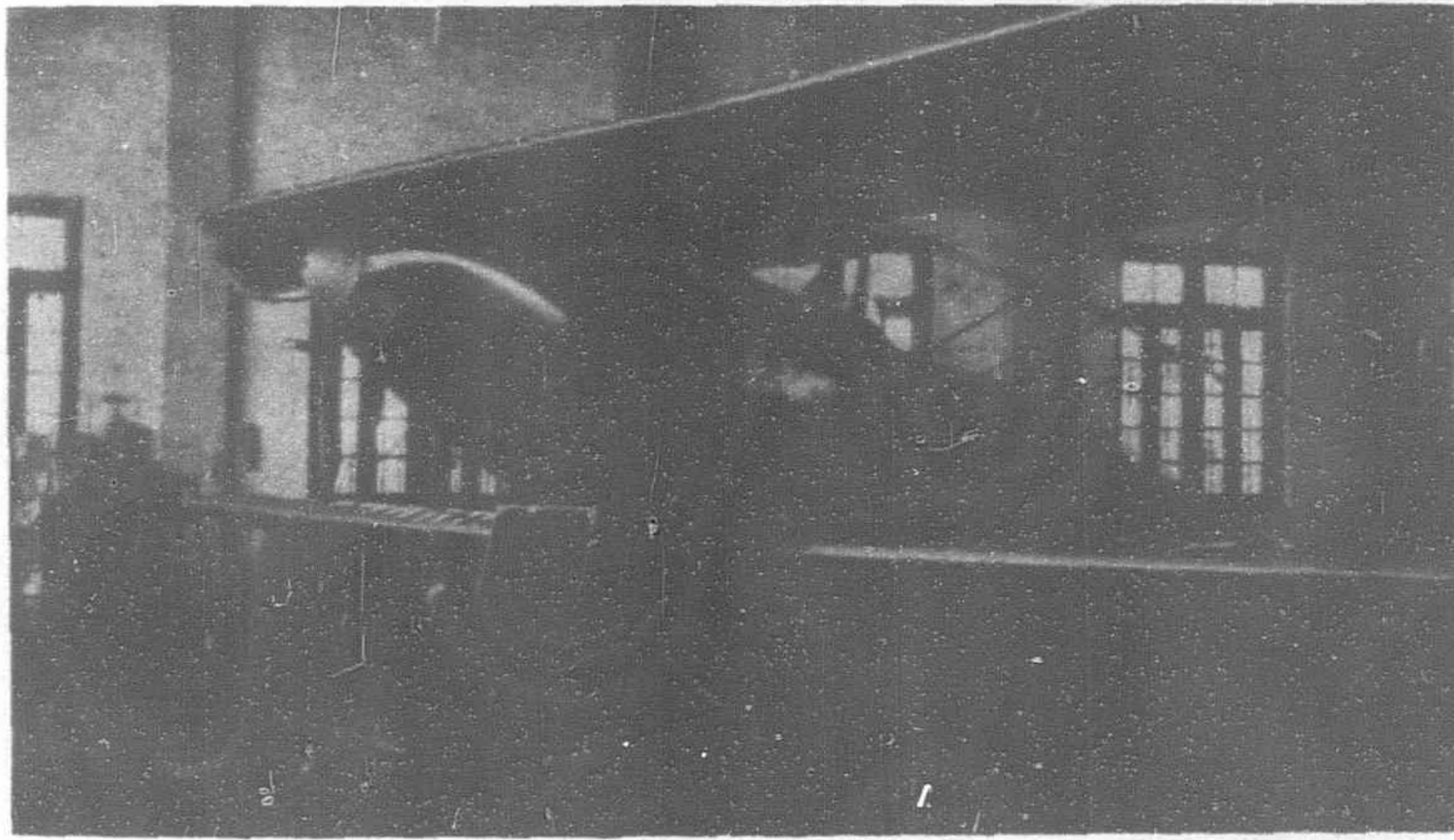
A very promising oilfield, extending some 200 Chinese li, is reported to have been discovered in the neighborhood of Kolonti, a point some ten Russian miles from Jalainor in the western section of the Chinese Eastern Railway.

The discovery is alleged to have been made on March 15, when a certain Chinese struck oil in the neighborhood of Kolonti and later discovered the existence of a very promising oilfield.

An application has been filed by Mr. Mesado, a Russian prospector, and Mr. Chin Fu-sheng, a Chinese capitalist, for the creation of an oil company called the Fuli Oil Company for the operation of the new oil field. The new company will be capitalized at some 5,000,000 yuan and the application requests a lease for 20 years.



Choy Keeme, Engineer and Instructor, Canton Aviation School, standing alongside an "Avian" Light Training Plane



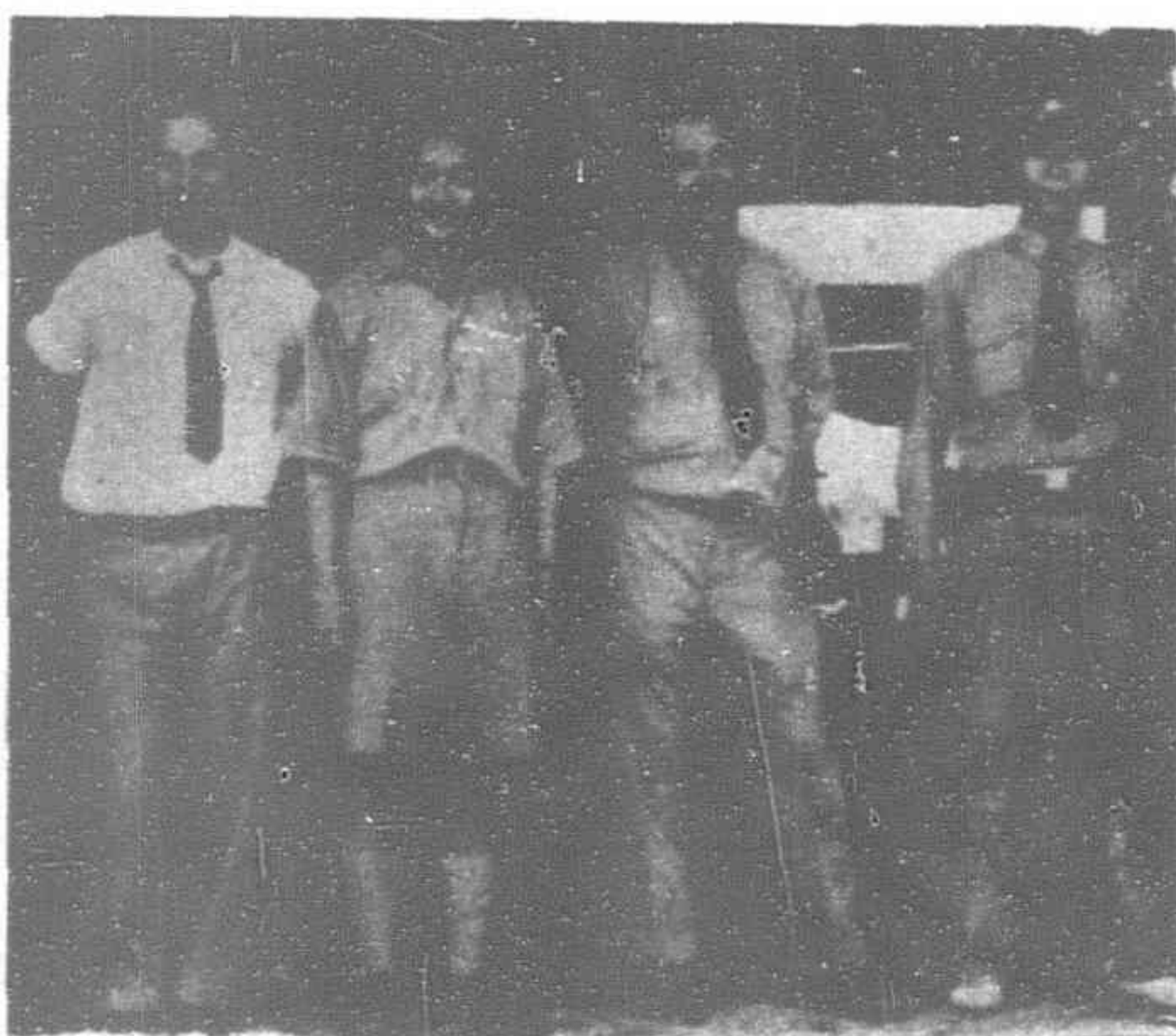
Airplane Built by Students of Canton Aviation School

Aviation in South China

By G. W. BROPHY

RAPID progress is being shown in South China towards the development of military and commercial aviation. Companies are forming in Kwantung and Yunnan Provinces to connect up the principal cities throughout South China with airlines carrying passengers and mail, while rapid strides are being made towards the development of an efficient military air force by the Canton Aviation Bureau and the Canton Aviation School, under the supervision and direction of General T. Y. Wong. General Wong received his aviation training in the United States where he had the opportunity to investigate commercial airlines and witness the progress towards the development of aviation in the United States. The Headquarters of the Canton Aviation Bureau are at Taishatao Airdrome which is located about two miles from the city of Canton on the Canton River. The airdrome covers about seventy acres of ground and has facilities for land planes and a sea plane base located on the Canton River. Modern

steel hangars with concrete floors with complete machine shop and repair facilities for the repair and storage of over thirty planes are available at Taishatao Airdrome, making this airdrome one of the finest in South China. The Canton Aviation School has over sixty-five students who, at the present time, are being trained as military and commercial pilots. Most of the instructors at the Canton Aviation School are returned students from the United States and are highly efficient as advisers, instructors, engineers, and students are making rapid progress under their supervision. Negotiations are under way, at the present time, for the lighting of Taishatao Airdrome with an American firm, which specializes on the lighting of airdromes, for night flying. When this lighting system is completed, Taishatao Airdrome will be the only airdrome which is equipped for the landing of planes day or night. This lighting system will include a complete motor generator outfit, eight 450 million candle power flood lights, boundary lights and a search light or beacon (Continued on page 646).



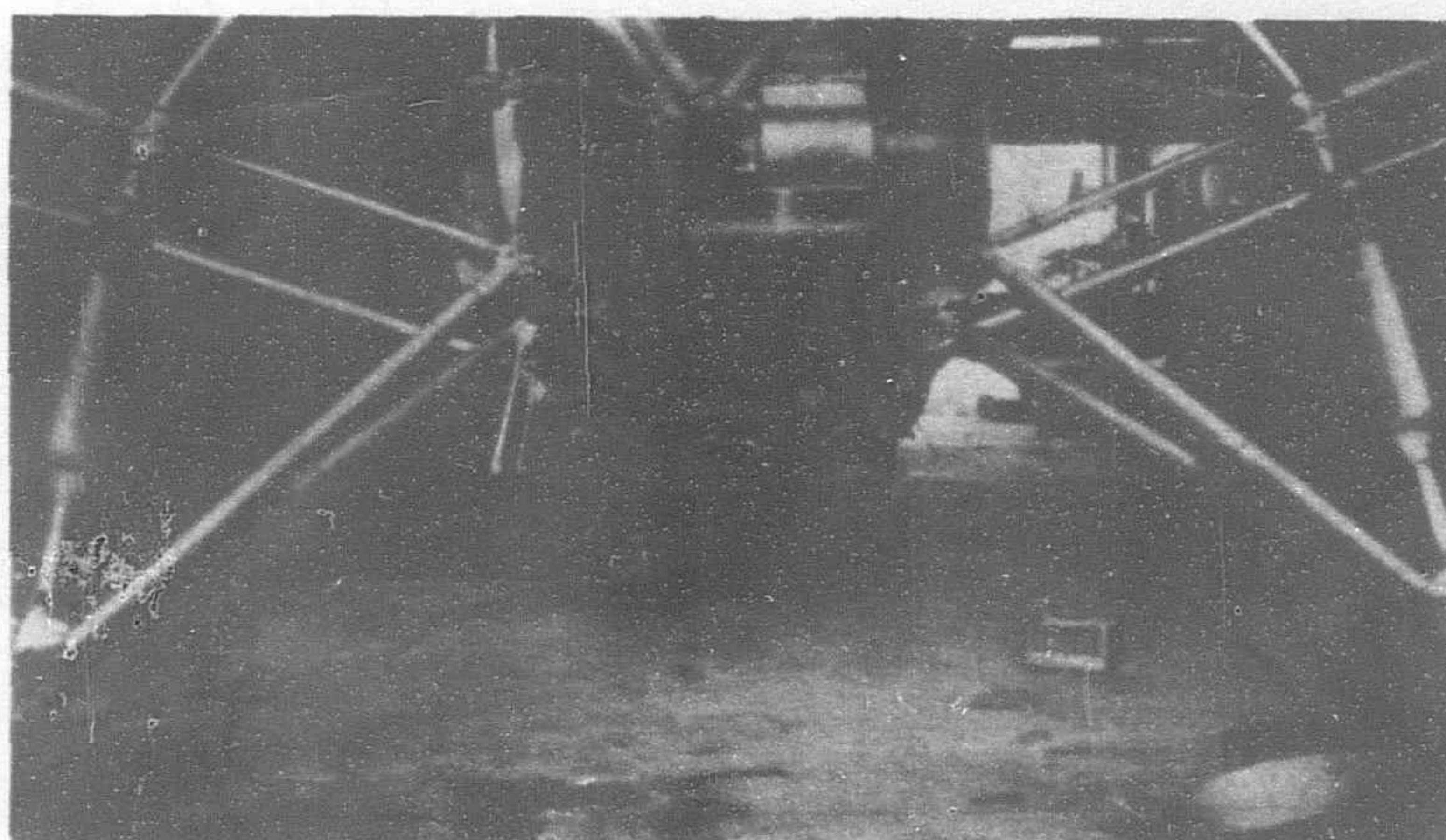
Instructors and Pilots of Canton Aviation Bureau



General T. Y. Wong, Director of Canton Aviation Bureau and G. W. Brophy; Ryan Seaplane



Waco Commercial Airplane Converted into a Military plane by the Canton Aviation Bureau



Ryan Commercial Airplane Converted into Military Bombing Plane, showing Installation of Bomb Racks below Fuselage

Self - Contained Generating Plant

Installations for Chinese Mills

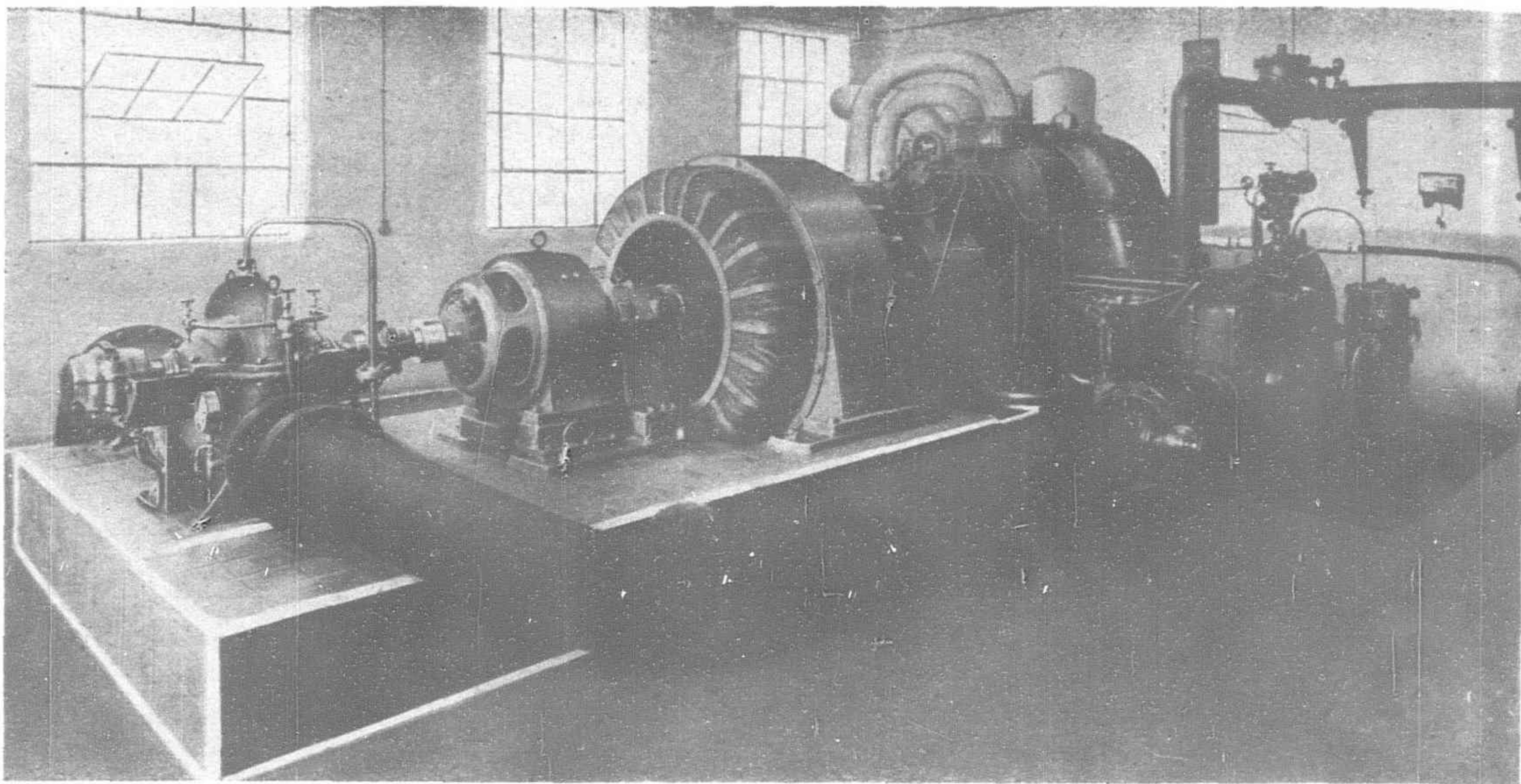
AMONG the many installations which have been made of the self contained turbo alternator sets recently developed by the Metropolitan-Vickers Electrical Company the set shown in the accompanying illustration is of special interest as the first to be put into commission in the Far East.

The installation is a 1,250 kw. set in the Hua Feng Cotton Mill of the Japan China Spinning and Weaving Company at Woosung, near Shanghai. It replaces two old 400 kw. turbo alternator sets and is part of a complete re-equipment of power plant, new boilers having been installed at the same time.

The new turbo alternator set is mounted at the floor level of the old condenser basement, a convenient arrangement made possible by the fact that sets of this type require no basement themselves nor even foundations as ordinarily understood. It will be noted from the illustration that in this case the set is mounted on a low concrete plinth which is faced with tiles giving a particularly neat finish to the compact arrangement. The illustration shews also how the arrangement of the turbine and condenser eliminates the need for a basement. All the auxiliaries of the set are direct driven from the set itself, and thus require no separate control, or external power supply.

The turbine is a high pressure machine designed for operation at 5,000 r.p.m. with steam at 300 lbs. per sq. inch gauge pressure at the turbine stop valve, superheated to 680°F. The generator is gear driven at 1,200 r.p.m. and generators at 600 volts, 3-phase, 60 cycles, this being the supply required for the existing motors for the mill drive. The equipment includes an automatic voltage regulator mounted on the generator control panel.

The installation was completed and put into commission in February of this year. A report now received by the Metropolitan Vickers Electrical Co., from Mr. F. Ohnishi, Engineer-in-Chief to the Japan-China Spinning and Weaving Company, states that the set has given complete satisfaction in continuous operation since



1,250 kw. Metrovick Self-Contained Turbo-Alternator Set in the Hua Feng Cotton Mill, Woosung

its installation, no trouble having been experienced with any part of the equipment and the guarantees with regard to steam consumption having been satisfactorily met.

Another set of these type is at present being installed in China for the Loong Chang Paper Mill. This equipment is a 1,000 kw. set, similar in general arrangement to the set above described except that it is arranged to pass out steam required for heating the calenders of paper making machines in the mill. This feature, which, can readily be provided with sets of this type, is one which effects considerable economy in the power system, since the steam required for process work can at very low extra cost be used to give energy in the early stages of the turbine. In the Loong Chang installation the turbine is designed to operate with steam at 160 lb. per sq. inch pressure and 250°F. superheat, and to pass out 9,000 lb. of steam per hour at 40 lb. per sq. inch pressure while maintaining full out from the set. The set is also arranged to pass out steam amounting to 11,500 lbs. per hour, with an output of 800 kw. from the generator, for short periods daily when this extra process steam is required.

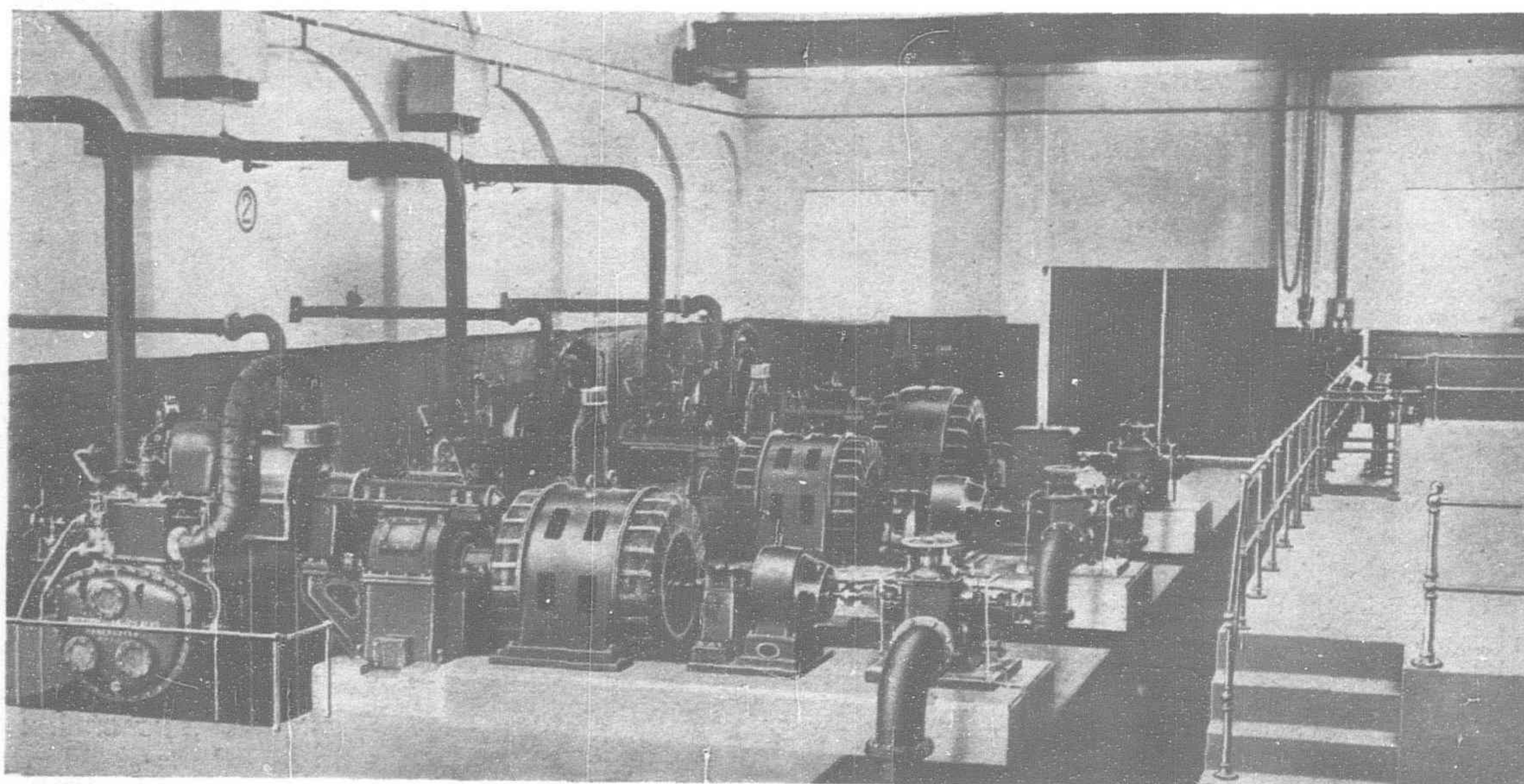
The continued success of the Metropolitan Vickers self contained turbo generator sets is shown by the steadily increasing number supplied. The number of sets installed and on order has now risen to about 100 with a total capacity of about 100,000 kw. Of these sets twenty-three are for the British Navy, four for the Japanese Navy, two for the Chilean Navy, three for the Singapore Naval Base and the remainder for a variety of municipal and industrial undertakings, including

ten sets for textile mills. The sets are manufactured in sizes giving a range of capacities from 200 kw. to 6,000 kw. and are notable for their low installation cost, high efficiency and simplicity of operation.

Some Installations In India

The accompanying illustration shows an interesting example of a recent installation in India of the self contained turbo alternator sets which were first developed about two years ago by the Metropolitan-Vickers Electrical Company and which have since that time achieved marked success on account of their low installation cost, high efficiency and simplicity of operation.

The illustration is of three sets recently completed in the new Irwin Power Station of the Gwalior State Public Works Department



Metrovick Self-Contained Turbo-Alternator Sets Installed in the Irwin Power Station of the Gwalior State Public Works Department, India

at Moti Jhil near Gwalior. This power station, named after the present Viceroy, who laid the foundation stone last year, is part of an interesting scheme originated by the late Maharajah Shndia of Gwalior to provide a modern water supply for his capital city of Lashkar and the adjoining old capital of Gwalior. The scheme, continued by the Council of Regency and finally sanctioned in 1926, includes the provision of a filter plant, a pumping station and a reservoir for supplying water at a maximum rate of $4\frac{1}{2}$ million gallons per day, based on an allowance of 30 gallons per head per day for a population of 150,000. The old oil-engine power station of Gwalior being inadequate for the new requirements it was decided to build a new power house on the filter site at Moti Jhil, of sufficient capacity to supply both the pumping plant and the city distribution system.

The Metropolitan-Vickers Electrical Company acted as main contractor for the erection and equipment of the new station and also for the equipment of the pumping station which is housed in the power station building. The steam raising equipment, supplied by Messrs. Babcock & Wilcox Ltd., includes three water tube boilers with integral superheaters, mechanical chain grate stokers and a fuel economiser. The generating plant consists of one 1,000 kw. and two 500 kw. turbo alternator sets of the self contained type, in which the condenser is built integral with the turbine and all the auxiliaries are direct driven from the set itself, thus requiring no separate control or external power supply. The illustration shows the compact arrangement so obtained, no condenser basement being required and only a low concrete plinth in place of elaborate foundations. The turbines, supplied with steam at 200 lb. per sq. in. gauge pressure and 200 degs. F. superheat, operate at 5,000 r.p.m., each turbine transmitting its drive to its generator through a double helical single reduction gear of 5 to 1 ratio. Electricity is generated at 3,500 volts, 3-phase, 50-periods and a transmission line at this voltage connects with the

old oil engine station, which is now used as a transforming and distributing centre.

The pumping station is used to pump water, after it has passed through a filtration plant, to a reservoir on a hill about a mile away. The pumping plant consists of three Mather & Platt "Medivane" two-stage centrifugal pumps each capable of delivering 1,600 gallons of water per minute against a total head of 240 ft. and each direct driven at 1,470 r.p.m. by a Metrovick 175 hp. slip-ring induction motor. The motors are controlled by Metrovick liquid starters and ironclad switch pillars.

Another installation in the Gwalior State shows an interesting variation of the use of the self contained turbine. This installation, made for the Jiyajeerao Cotton Mills Ltd. to the order of Messrs. Birla Bros. Ltd. of Calcutta, who are managing agents for the mill company, includes a 2,500 b.h.p. turbine of similar type to those described above but arranged for mechanical drive of the mill machinery and also arranged to pass out steam required for process work. The turbine is supplied with steam at 160 lbs. per sq. in. gauge pressure and 200 degs. F. superheat and operates at 5,000 r.p.m. The drive is transmitted through two stages of reduction gearing with a direct coupling from the second low speed shaft at 300 r.p.m. to the ring shaft of the mill. The turbine is arranged to pass out steam up to 15,000 lb. per hour at a constant pressure of 35 lb. gauge for use in spinning, sizing, weaving and calendering departments. The amount of process steam used can be varied, and its pressure is maintained constant, independently of the mechanical load on the turbine. The feature of pass-out steam supply, which can readily be provided with turbines of this type whether used for mechanical drive or generation of electricity, is one which effects considerable economy in power systems, since the steam required for process work can at very little cost be used to give energy in the early stages of the turbine.

Remarkable New Oil Engine for Motor Boats

Uses Oil Fuel Costing Only 5d. per Gallon

It has long been the aim of Internal Combustion Engineers to produce a small engine, operating on the Diesel principle, for motor boats, auxiliary yachts and commercial craft such as tugs and self propelled barges.

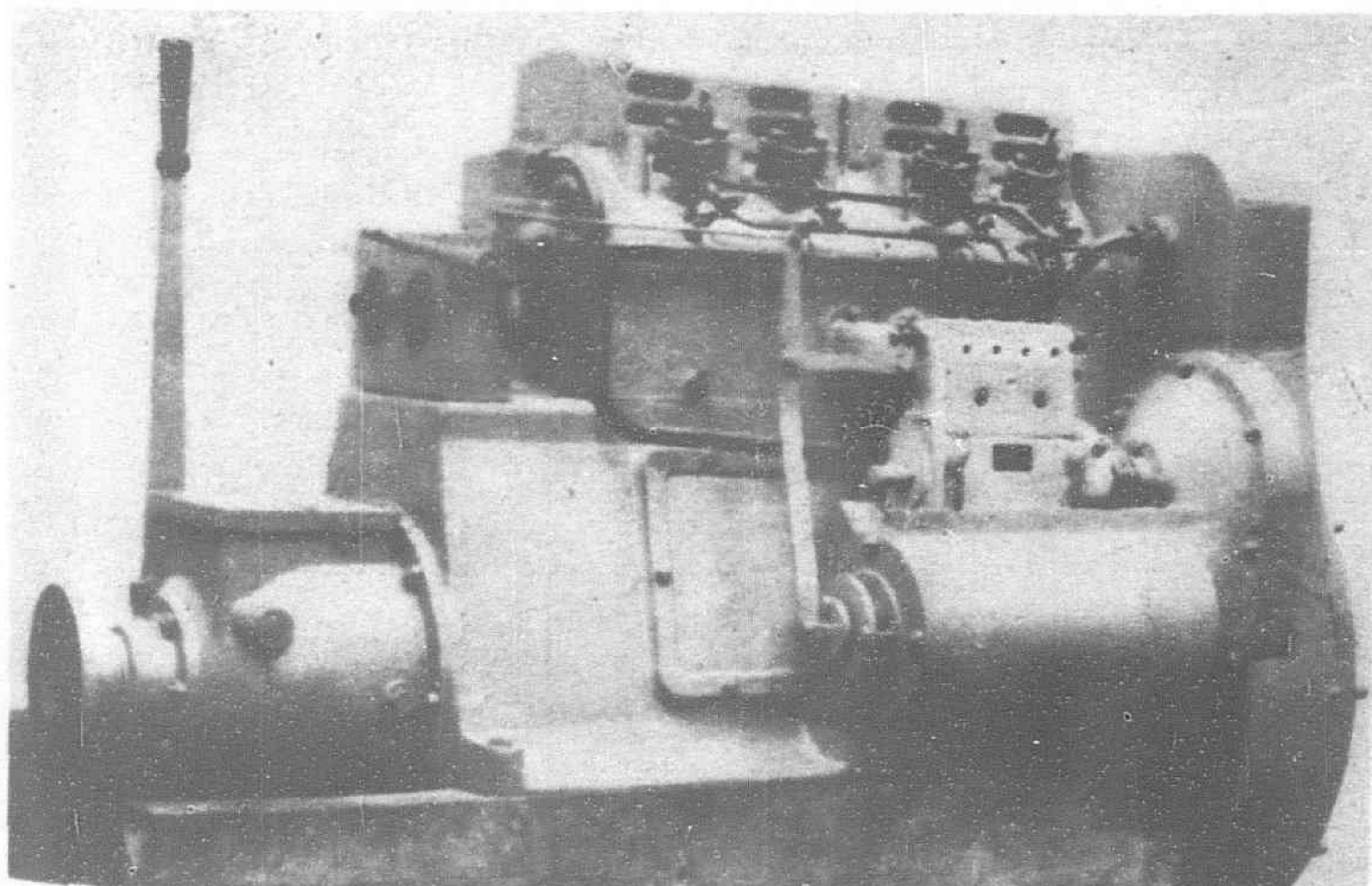
After three years of intensive experimenting the details are now revealed of a remarkable new oil engine which the Ailsa Craig Motor Co., Ltd., of Chiswick have just completed at their Strand-on-Green Works. It is a 4-cylinder unit of 40 h.p. operated on the Acro-Diesel principle using ordinary Diesel Oil. It not only incorporates the moderate weight, instant starting and smooth running of the familiar petrol engine but by using a fuel of such low flash point as Diesel Oil it cuts out fire risk and the fuel bill is only a quarter that of Petrol.

The engine is started by merely pushing an electric button

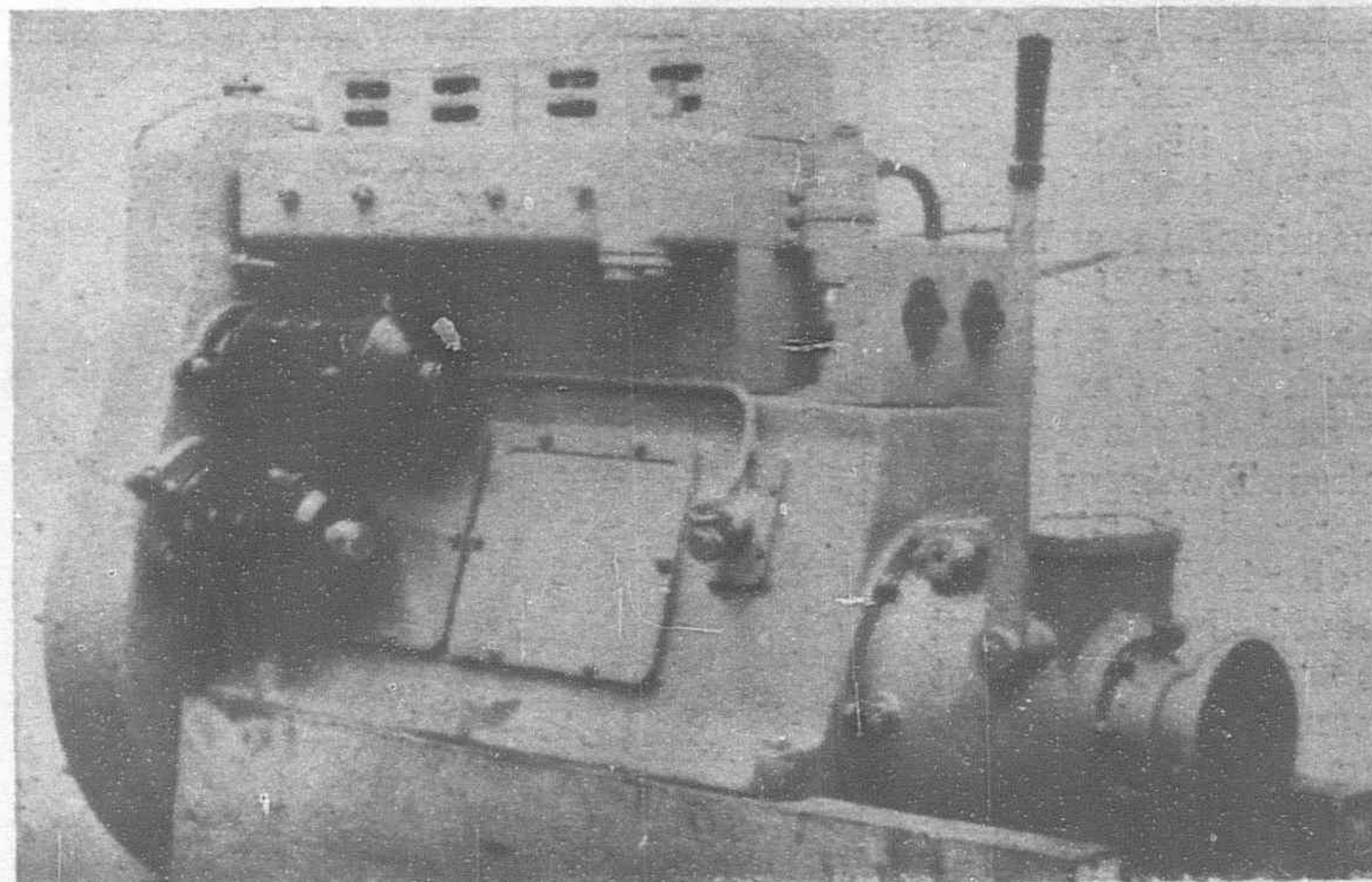
just as a car engine. Although primarily designed for marine work it is equally useful for driving air compressors as well as electric welding and lighting sets, especially is it suitable for emergency lighting sets on ships.

As a marine engine one of its most useful fields is for motor lifeboats. Now-a-days when large motor liners are more and more taking the place of steam driven ships such an engine as the new Ailsa Craig Acro-Diesel is particularly desirable for it obviates the necessity of having to carry a supply of highly combustible fuel like Petrol or benzine for the fuel it uses is always at hand on such vessels whose engines are driven on the Diesel principle.

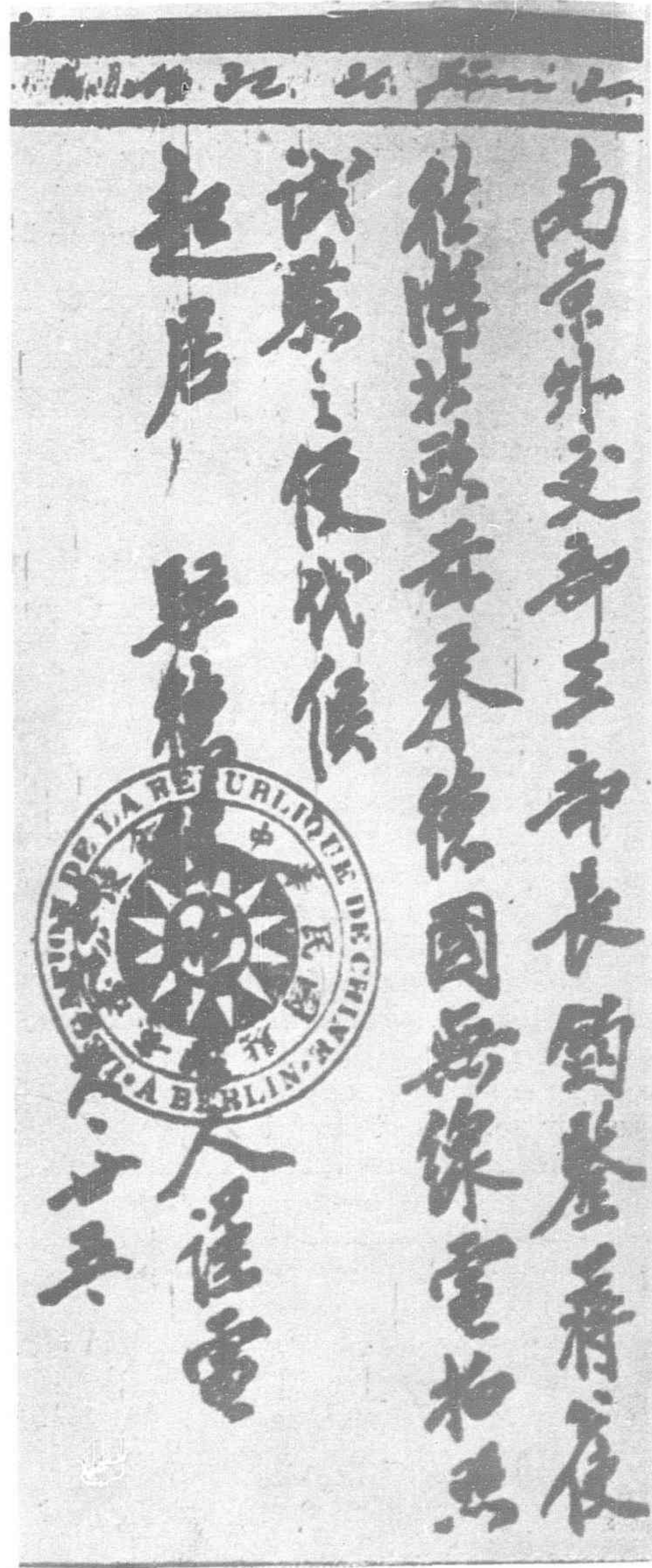
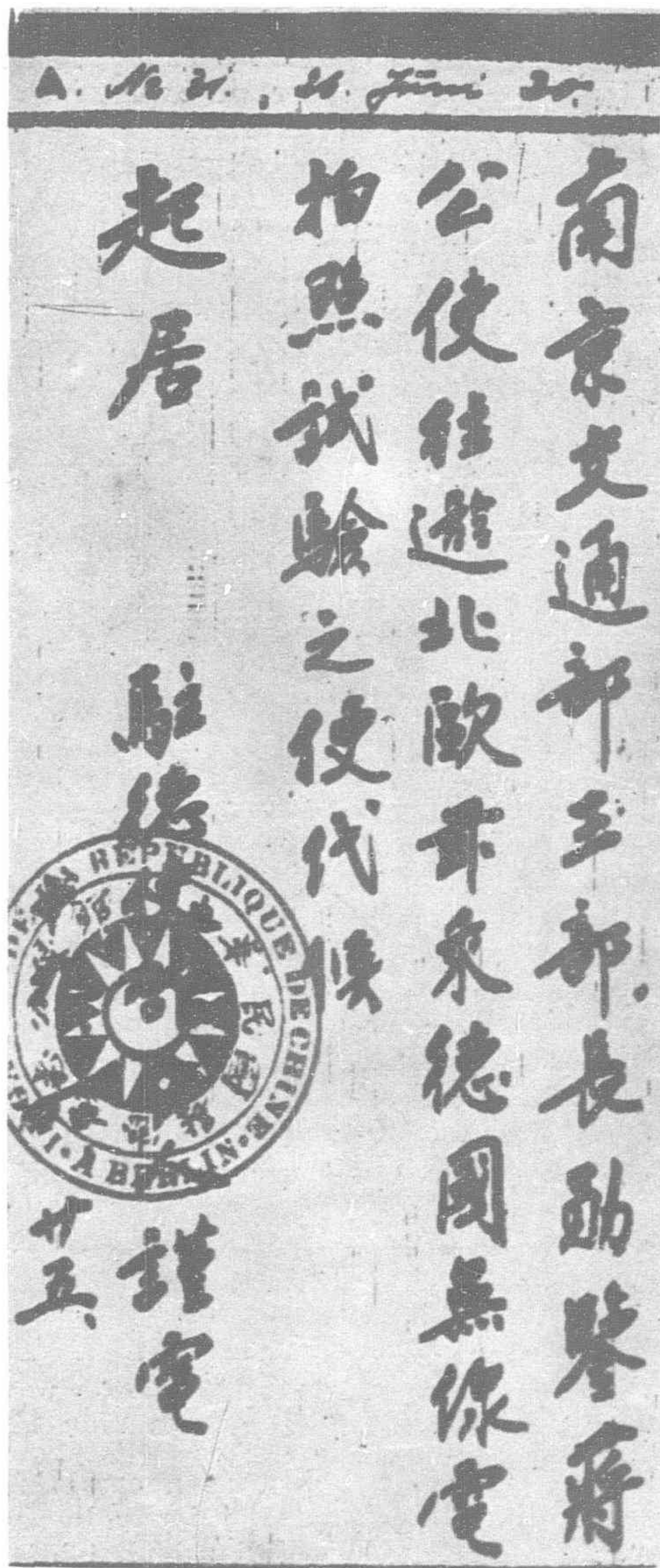
Needless to say the advent of this new engine opens up far-reaching possibilities and has created widespread interest among engineers and yachtsmen the World over.



Starboard View of the Ailsa Craig Acro-Diesel Marine Motor. Note the Neat and Compact Injection Pump and Governor Layout



Port Side View of the Ailsa Craig Acro-Diesel Engine Showing the Enclosed Waterproof Design. Even when submerged for Three-quarters of its Height the Engine will Continue to Operate



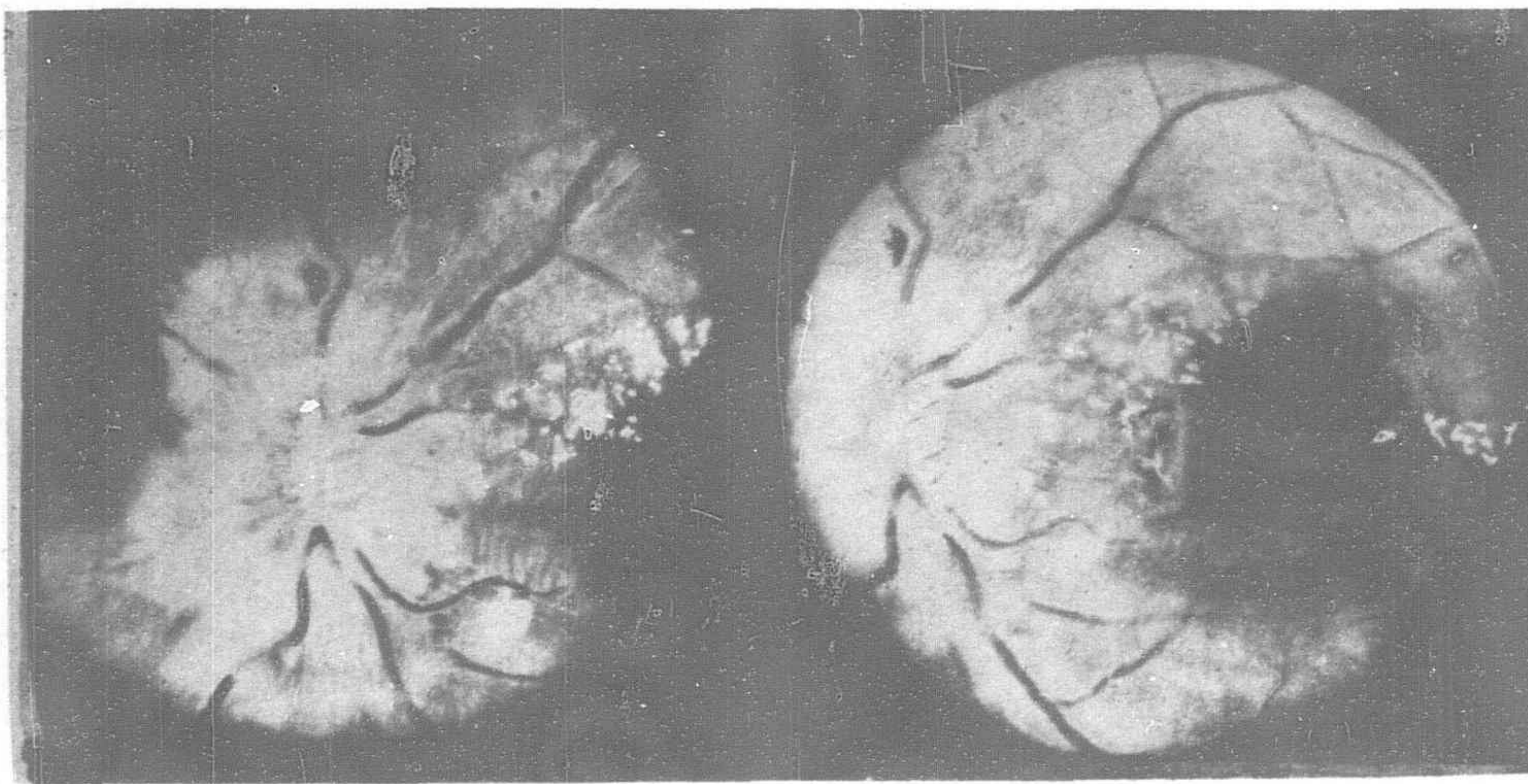
First Test of Picture Telegraphy between Berlin and Nanking, June 25, 1930; Left, President Hindenburg; Center, Congratulatory Message from Chinese Minister at Berlin to Minister of Communications at Nanking; Right, Similar Message to Dr. C. T. Wang, Minister of Foreign Affairs, at Nanking.

Picture Telegraphy

The Solution to Rapid Sending of Chinese and Japanese Characters without Numeral Codes

By Chief Engineer R. HIRSCH, Berlin

AN Argentinian who was taken ill in Berlin had his eyes examined in a Berlin hospital. To facilitate the diagnosis, a photograph of the background of the eye was taken. The Argentinian proposed that his own doctor in Buenos Aires should be consulted as regards the present examination. The sending of the photo by mail steamer, however, would have taken at least 16 days and there was no time to lose. It was, therefore, determined to make



The First Wireless Long-distance Diagnosis

A photograph of the background of the eye which was transmitted by wireless by the Telefunken Co. from Berlin to Buenos Aires in eight minutes.

use of the wireless photo-transmission equipment Berlin-Buenos Aires, which was installed for the Transradio Company by the Telefunken Company of Berlin. Transradio transmitted the photograph of the eye by means of the short-wave station in Nauen in eight minutes to Buenos Aires. The photo arrived in such perfect condition that the Argentinian doctor was able to make his own diagnosis which he transmitted to his Berlin colleagues by

La tele-fotografía ha sido tan admirablemente transmitida
que en interpretación fue por demás sencilla, al punto de
haberme permitido hacer el diagnóstico y el pronóstico,
antes de recibir verbalmente de Ud., los datos del historial
clínico. al Dr. Lijo Pavia - Berlín -
Cordialidades y saludos a los Profesores von Bergmann y
Kruckmann -
Mariano R. Castex
Chembe 35-929

Translation of the above photographic letter which was transmitted by wireless by the Telefunken Co. from Buenos Aires to Berlin.

"The televised photograph was transmitted so well that it was clearly understandable. I was therefore able to complete my diagnosis and prognosis before I received your verbal account of the disease."

To Dr. Lijo Pavia, Berlin, with best wishes and compliments from Professors Bergmann and Kruckmann. MARIANO R. CASTEX.

means of the same short-wave route by telephone.

The medicinal diagnosis of a complicated ailment by means of a wireless photo sent 12,000 kilometres! There is no better proof of the high standard of the Telefunken Picture telegraphy and wireless telephony; no better proof of the advantages and uses of wireless.

The future importance of picture telegraphy can also be judged from the remarks made by the vice president of the largest American Radio Communication Company, Mr. Winterbottom, before a special commission of the American Senate.

Mr. Winterbottom gave the Commission a very clear picture of the progress of radio as a basic factor of world trade, informing it of the new lines which had been opened in 1930 and prophesied great technical improvements in the near future.

"Those who are actively engaged in Radio communication matters, believe that we are only at the commencement of improvement. Something still quicker, more reliable and cheaper must be discovered. Lately a lot has been said about picture telegraphy. It seems that this new method of communication will bid fair to revolutionize telegraphic transmissions." Mr. Winterbottom showed the commission several examples of picture-telegrams to prove how much progress had been made. He also mentioned that photo-telegraphy had been installed for over a year between Germany and Argentina.

President Sarnoff, a member of the Commercial Radio International Committee, is of the opinion that picture telegraphy will increase in importance in future. It will be of little use in broadcasting but in many cases will replace telegraphy in commercial communication. This depends chiefly on the further improvement of short-wave communication.

Shortly after the first trials with picture telegraphy, had shown the possibilities of this new method of news transmission, it was realized that this was chiefly of importance for those countries that use syllable and picture writing instead of the ordinary letters. Thus the real field of exploitation for picture telegraphy is the Far and Near East, China, Japan, India, Siam, Persia and Arabia. Since the use of the telegraph, both wireless and wired, is continually increasing in these countries, the demand for picture telegraphy will also increase. The old means of telegraphy which have been and are still in use in the western countries, transmit the words letter for letter by means of Morse signs. This is unsuitable for oriental languages, since German and English can be telegraphed by means of 25 letters, Russian with 36 but there is no Morse alphabet for the thousands of Chinese characters.

In China, therefore, they have to compromise. Dictionaries have been prepared in which every word and every syllable in Chinese has been translated by a group of figures. These figures are then telegraphed by Morse and then retranslated at the reception point. It is understandable that such a telegram which has to be written and rewritten four times is especially liable to errors.

All this trouble and these sources of error are absent with picture telegraphy. By this method, the original telegram is inserted in the transmitter and a photograph copy of it appears in the receiver. The mechanical replaces the human element and all sources of error are eliminated.

Photo-telegraphy is not only of importance in China itself, but also for communication to exterior countries. This was shown recently by the picture telegraphic experiments between Berlin and China. These trials were made by the Telefunken Co. supported by the German and Chinese authorities. The Telefunken Beam Transmitter used by the Transradio A. G. in Nauen for the regular telegraphic communication and for telephony trials with the Far East was made use of. A picture telegraphy receiver was installed in Nanking with a directional aerial consisting of 16 dipoles, connected in rows of four. The quality of the received pictures was excellent. We reproduce here a photograph of an extract from the *Peking Morgenpost*, showing a letter sent by a Chinese Engineer in Berlin to his father. The telegram reads:—"Mr. Li, Director of the

Morning Post, Peking.

"The attempt to transmit radio photos from Berlin to Nanking is successful. I am especially pleased to be able to transmit my greetings in this way. I hope our banks will help to arrange the definite installation of this picture telegraphy. The birth of the picture telegraphic is of extreme importance not only for communication between China and Germany but especially for internal use in the China provinces."

The *Peking Morning Post* added the editorial note (shown on the left of the following photograph):

報鐘商得
，京力
清成公風
晰績開根
明甚試無
瞭佳驗綫
，，成雷
可左功報
謂印，公
中由山司
德柏林發
兩林京明
國傳柏之
間至林無
電南間綫
信京傳真
上之遞電
別無祇報
開綫需，
紀電傳四
元傳真分
也真半
。電在

北平新報專電長鈞鑒南京與柏林間用電傳
送呈跡甚佳法久經試驗現已奏效光臨春之餘特
借此法向候起居並希望我國銀行界對此事竭力
贊助俾得迅速及接受處及其他種種設置可早日
成立不特在中德兩國間電信上別開紀念尤即我
國內地亦必早起響應並採用此法也專此誌請
金安
長男法蘭西柏林寄 十九年七月十日

"TEN-TEST"

Canada's Big Insulation Appeal to China

CHINA is now universally recognized as rapidly equipping herself with the best of modern ideas and practices in every sphere of her activity, but there is perhaps no greater admiration for her, and desire to work and trade with her for their mutual benefit, than that which is apparent in Canada to-day.

This giant young country is daily growing more to appreciate her great neighbor on the other side of the Pacific, and every year sees new trade developments between them, founded on the solid basis of mutual respect. For China, with her multitudinous demands for everything that she considers best in modern use, finds much of her needs easily and economically supplied by her young and up-to-date friend over the way. And there is perhaps no stronger appeal from modern and efficient Canada to modern and efficient China than the appeal of Insulation.

This principle, now in almost universal practice throughout Canada and fast spreading through the entire world, is, in its simplest terms, the use in every type of construction of a barrier which effectively keeps out heat, cold and noise.

Canada has for the last twenty years been producing on a vast scale the ideal material for Insulation purposes, so that the name "Ten-Test Insulating Building Board" has become a household word throughout the Dominion.

Ten-Test is a manufactured lumber specially created to meet every Insulation demand. It is a product of Canada's wonderful forests, and so one of the staple and basic industries of the country. It is made from the fibres of the Great Northern Spruce, probably the toughest raw material that is used in the manufacture of any Insulating material, and is prepared under a series of exacting processes, being welded into a solid homogeneous board under hydraulic

pressure of 2,000 lbs. to the square inch. The millions of minute sealed air-cell surrounded by non-conducting spruce fibre that are set up by this enormous pressure resist the passage of heat, cold and noise as rubber resists that of electricity.

Insulating value is calculated by the number of British Thermal Units of heat that will pass through a given material per hour, per square foot, per inch thickness of material, for every degree difference in temperature on each side of the material. That is to say, if a given material has an Insulation value or British Thermal Unit rating of .50, it means that .50 British Thermal Units of heat will pass through one square foot of that material one inch thick in one hour for every one degree difference in temperature on each side of the material.

On this basis Ten-Test has repeatedly been proved, by experiments conducted by the United States Bureau of Standards and independent experts from Canadian Universities, American Universities and Chemical Engineering Companies, to be a better Insulator even than Cork Board, which hitherto had been universally recognized as the most efficient Insulator known. This comparison, based purely on average British Thermal Unit ratings arrived at from many experiments, shows Ten-Test to have a rating of .324 as against Cork .33.

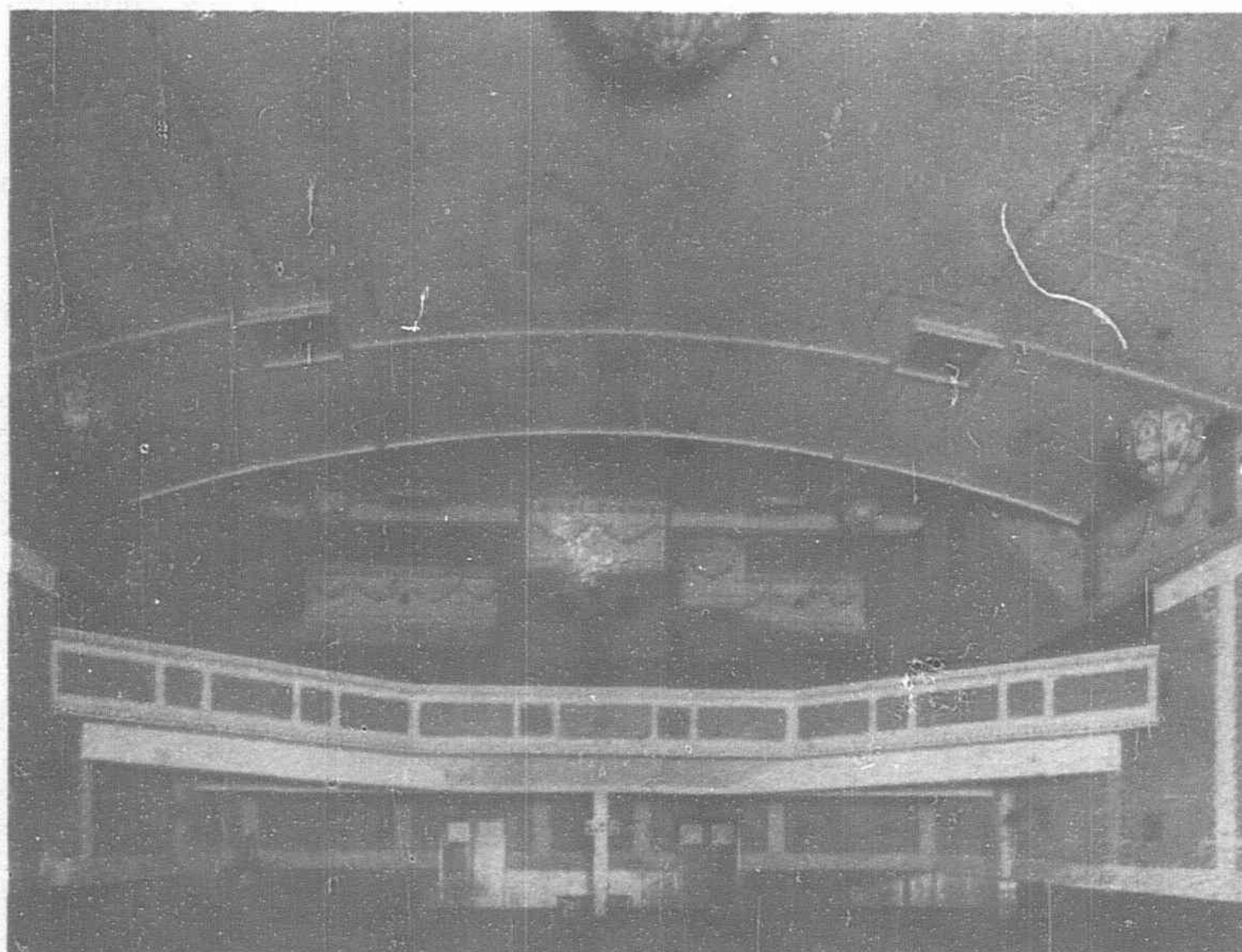
But a practical Insulating Board must possess several other properties before it can find favor with architects, contractors, refrigeration and constructional engineers, and become widely adopted for general building uses.

It must:—

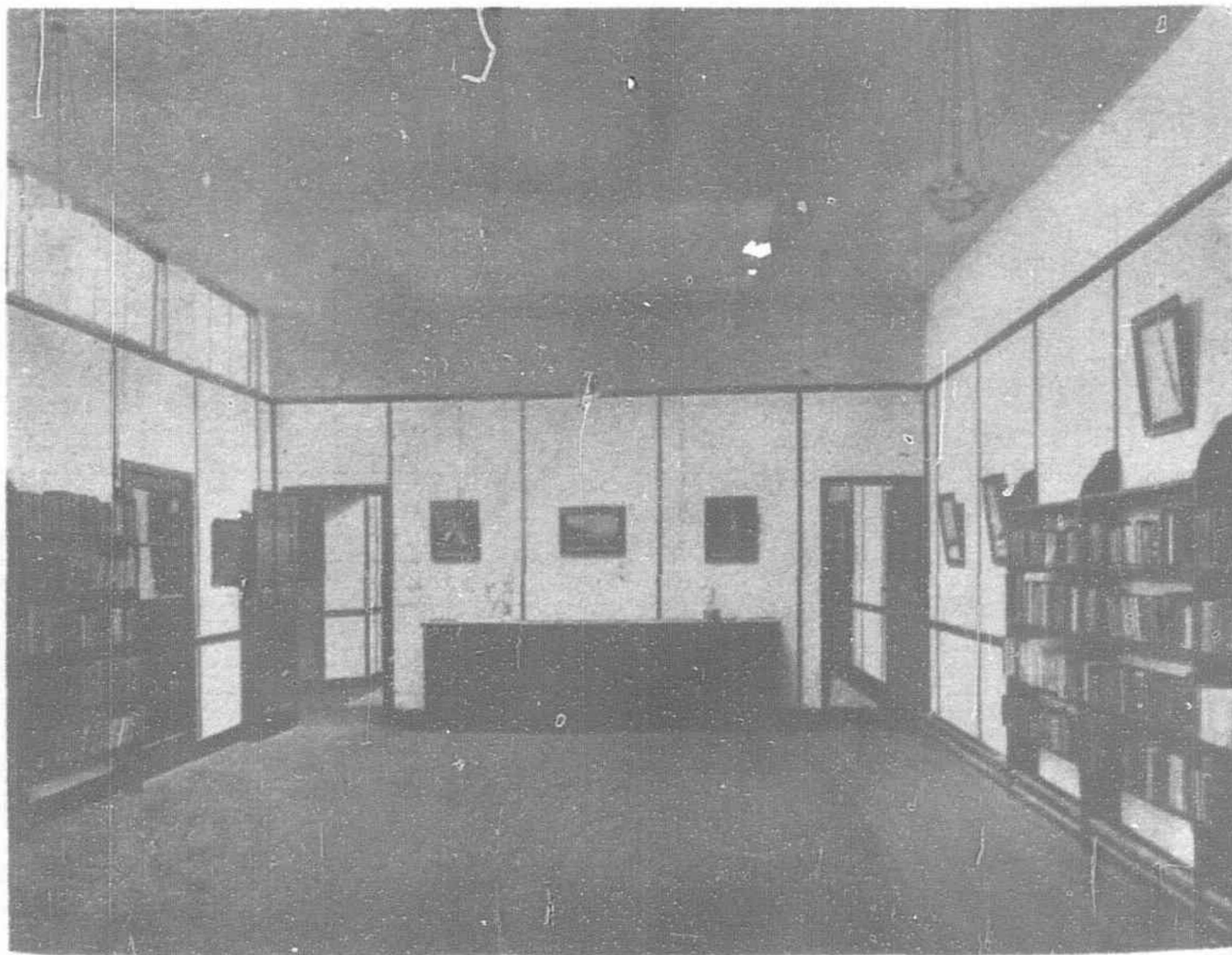
- (1) Have sufficient rigidity, tensile and transverse strength.
- (2) Be free from distortion under rigorous weather conditions.
- (3) Be moisture and fire-resisting.
- (4) Bond strongly with plaster, concrete, stucco, etc.



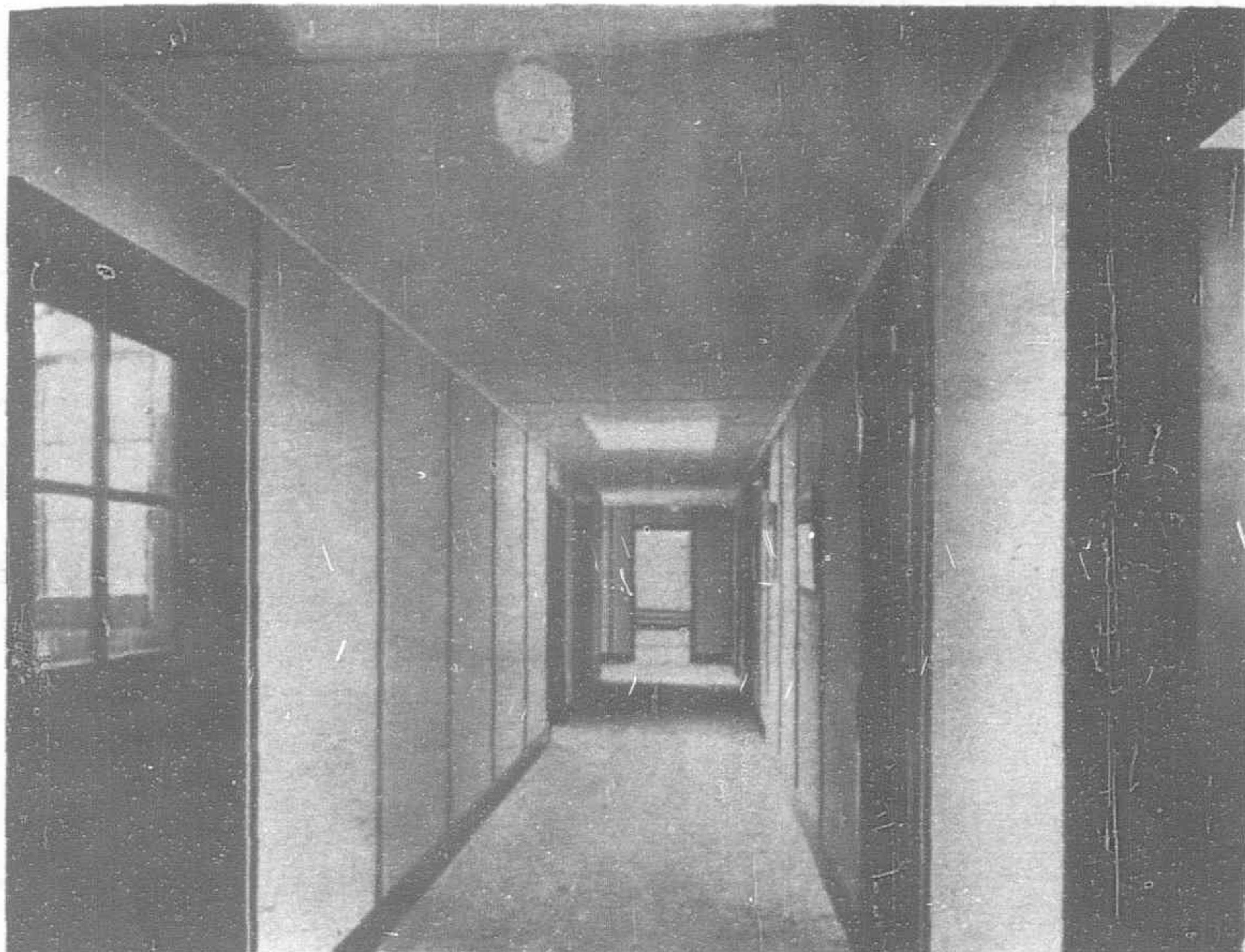
Cathay Mansions, Shanghai. TEN-TEST roof installation.



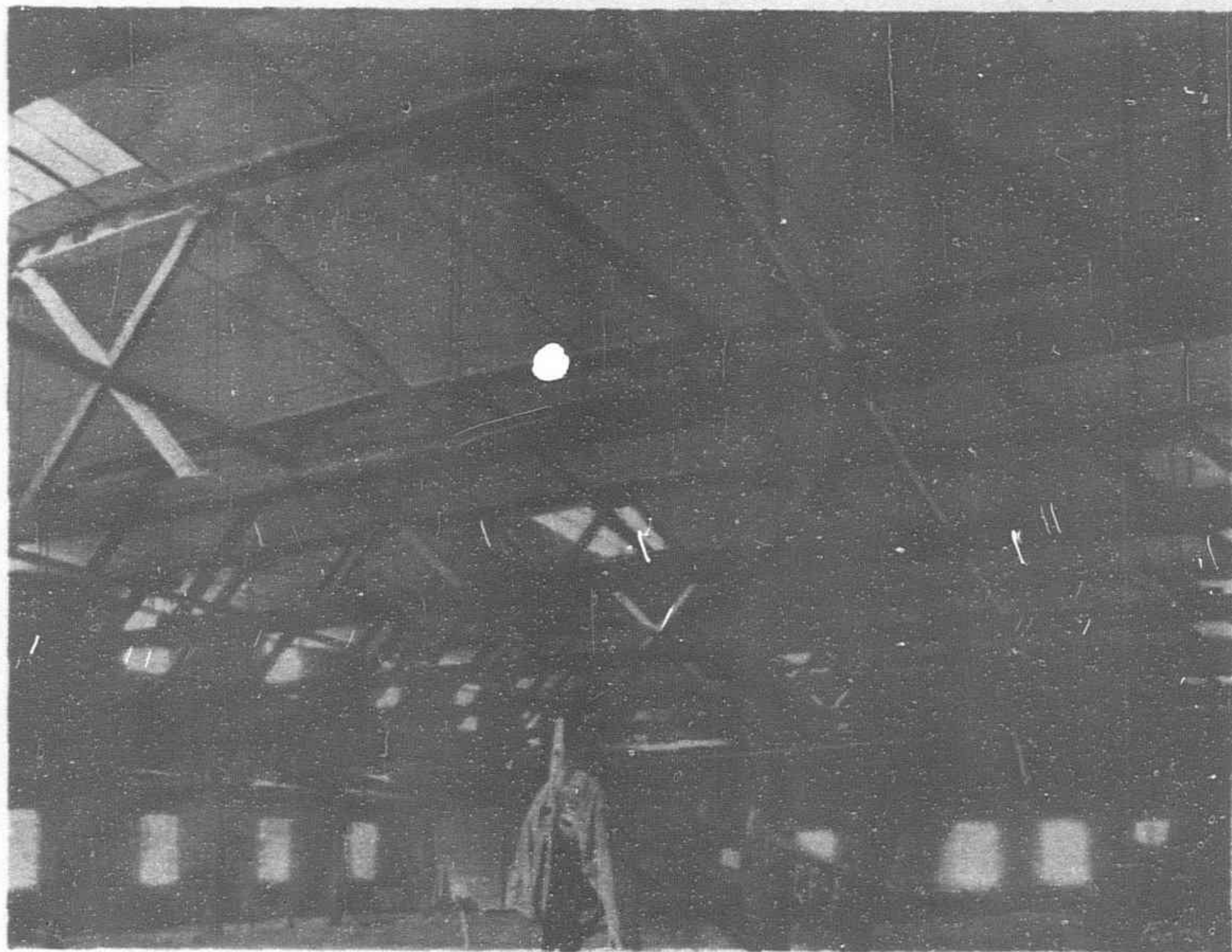
TEN-TEST on walls and ceiling for acoustical correction in Cinema, London, England.



TEN-TEST as wallboard panelling and on ceiling in school library, Gloucester, England.



TEN-TEST on Walls and Ceiling, in Ribston Hall School, Gloucester



Hangar in a modern American Air Port with TEN-TEST walls and on ceiling.

- (5) Be an efficient sound-absorber.
- (6) Decorate quickly, easily, and effectively.
- (7) Be proof against white-ants.
- (8) Be cheap in price.

It is illuminating to examine the above in detail and see just how completely Ten-Test meets every demand that even the most exacting can make of it.

(1) Rigidity tests prove that Ten-Test panels withstand a lateral pull of 3,000 lbs. while Bagasse (Sugar Cane) Board and Pine Wood panels of identical construction will bear a similar lateral pull of only 920 lbs. and 550 lbs. respectively before failing.

Tensile strength tests show an average ultimate strength of 228 for Ten-Test as against an average of 185 for other Insulating Boards.

Transverse strength tests show an average breaking load of 30.1 for Ten-Test as against 17.0 for Bagasse (Sugar Cane) Board.

(2) An extremely severe test for distortion, comprising no less than ten complete cycles, each consisting of 24 hours immersion followed by freezing, thawing and rapid drying, leaves Ten-Test absolutely unimpaired as to permanency and set. There is positively no increase in thickness after the final drying, and no tendency towards disintegration.

No other Insulating Board can survive this test unaltered, and there is no better example of the value of the homogeneous structure of Ten-Test and the toughness of its Spruce Fibre constitution.

(3) Capillary penetration is about $\frac{1}{8}$ -in. in 24 hours. Fire resistance is greater than that of ordinary lumber.

(4) Plaster bonded to Ten-Test will stand a load of 1,340 lbs. per square foot as against 1,060 lbs. for Bagasse (Sugar Cane) Board. This is far superior to the usual "Key" bond of plaster with wood lath.

(5) Ten-Test is probably the best sound Insulator known, its efficiency in this respect being twice that of Bagasse (Sugar Cane) Board. Its Co-efficient of Absorption is .35 with and Time Factor of .06, which means that .35 of any noise created in an area enclosed by Ten-Test is totally absorbed in .06 of a second.

(6) Ten-Test is capable of immediate decoration with plaster, oil-paint, distemper, color wash, paper or any desired finish. It also provides very pleasing panel effects in its own natural creamy color.

(7) Ten-Test is absolutely and permanently proof against the ravages of white-ants, cockroaches and other insect pests, a point which is of supreme importance in the tropics.

(8) The price of Ten-Test, apart from all considerations of quality, is intensely competitive in Far Eastern markets, as Agents and Contractors are well aware; and when in addition its superlative qualities are also considered, its instant and increasing popularity in the Orient is easily understood.

It is this unique combination of high Insulation value, sound deadening and acoustical properties, and inherent structural strength, all in their degree peculiar to Ten-Test alone, which makes it the ideal material for every modern Insulation requirement and appeals so strongly to a China who is fast adopting for her own needs all that she considers best in modern building practice.

An additional Ten-Test advantage is that it is the only solid and unlaminated Board that is offered in all thicknesses from 7/16-in. up to 2-in. and in all lengths from 6-ft. to 16-ft. x 4-ft. wide, so that an architect can have whatever thickness and length of solid board he needs to meet his particular Insulation problems.

If China to-day is building on a large scale what edifices will she not shortly be erecting worthy of herself and her new-found spirit of Nationalism? All this envisaged construction work will embody everything that in the opinion of her architects, Chinese and Foreign, is essential to such development, and Insulation will be, beyond doubt, freely specified and used.

It is therefore perhaps in keeping to state shortly the main uses of Ten-Test Insulating Building Board in general construction work, the ideal being to make the building cool in summer, warm in winter, and quiet all the time.

For Steel-Concrete construction, Ten-Test is used as follows, in whatever thickness may be necessary to meet specific conditions:—

- (1) As Roof Insulation: The sheets are laid together on the roof deck in a coating of asphalt and the roofing as specified is laid above them,—a simple and highly effective application.
- (2) As Ceiling Insulation: The sheets may be bonded direct to the under side of new concrete floors, to concrete being poured direct on to the board, or they may be attached by nailing to already finished



One inch TEN-TEST applied to the Interior of a concrete wall.

concrete floors. A Ten-Test ceiling effectively prevents condensation.

- (3) As Insulation on the Interior of outside walls, nailing or screwing to lumber strips or plugs being the usual application.
- (4) As Sound-Proof Partitioning with or without plaster. Ten-Test makes the ideal Partition Wall from the points of view of structural strength, sound-deadening and low cost.
- (5) As an Insulator against temperature and sound under hard-wood or tiled floorings. Ten-Test so applied will prevent buckling of the floor, so often caused by excessive expansion and contraction of beams.
- (6) As a sound deadener under carpets, linoleums etc.
- (7) As a boiler room Insulator, and as a vibration damper under machinery.

In mills, filatures, factories, work-shops, aerodromes, go-downs, tram-depôts, and garages, where condensation is often a vital problem and machinery or stock depreciates rapidly owing to big temperature variations, Ten-Test on roof or ceiling is the ideal answer. It will completely cure condensation troubles and its labor and stock-conserving properties, due to the new equable working and storing conditions it provides, are inestimable.

In brick or lumber-frame construction its main uses are :—

- (1) Nailed to the top and undersides of the roof-joists as Insulation under the roofing proper and also as lining for attics, which cease to be waste space when Insulated with Ten-Test.
- (2) As exterior sheathing, nailed to studding or brick walls and finished with brick-veneer, stucco, rough-cast, etc.
- (3) As Interior Wall Board, nailed to studding or brick walls and decorated to taste.
- (4) For Partition Walls.
- (5) For sound-deadening under hard-wood or tiled floors.

In theaters, auditoriums, lecture-halls, etc., Ten-Test Acousti Board greatly increases audition efficiency and entirely eliminates echo and dead-spots.

For camps, hutments, coolie quarters and temporary buildings of all sorts, Ten-Test provides a rigid, comfortable, cheap and rapid medium of construction, which is temporary only in the sense that it is not eternal.

But there is no hard and fast rule governing the uses or applications of Ten-Test. Every job has its specific problems, and Ten-Test has never yet failed either to be applied satisfactorily or to do its proper work after application. In a thousand apartment houses, office buildings, hotels, schools, theaters and private residences throughout the world Ten-Test to-day is providing its worth as only Ten-Test can.

From the point of view of economy, Ten-Test being as permanent as the building with which it is incorporated in whatever capacity effectively preserves the structure by preventing excessive and unequal contraction and expansion of steel, concrete, lumber and other materials used.

During the winter heating season Ten-Test Insulation will save at least 30 per cent. of the fuel bill. You pay for Ten-Test whether you buy it or not ; it is the best investment in the building world to-day. It is cheaper to have Ten-Test Insulation than to burn excessive fuel and pay high maintenance costs.

Ten-Test is an economy, not a luxury ; a necessity, not an extra.

The appeal that Ten-Test makes to the world and to the Far East in particular through its direct Representatives is simply this :—

We are modern ; we are efficient. We sell economy ; we sell comfort ; we sell a permanent investment ; in a word, we sell Ten-Test Insulation. Our appeal is to a modern and efficient China to catch up in one jump with the last word in modern building efficiency and economy—Ten-Test.

Aviation in South China

(Continued from page 639).

which will be visible from a distance of forty miles. The students of the Canton Aviation School will then be trained in the art of night flying and blind flying. It is very essential that military pilots should be qualified to fly day or night, so a complete course is being developed by General Wong for the training of students in night flying and blind flying. The Canton Aviation

Bureau recently placed orders for eleven planes, six military planes equipped with two machine guns and bomb racks ; two large commercial planes and three small training planes. The commercial planes will be used on a passenger-mail airline operating from Canton to Wuchow, and from Canton to Swatow and Amoy. A daily service of one plane each way will be maintained over the entire route carrying passengers and mail, with headquarters at Taishatao Airdrome, Canton. Arrangements are being made for the purchase of four more commercial airplanes to be used on this service, making a total of six planes. Four planes will be in service at all times and two planes to be held in reserve so that a daily schedule can be operated. Other lines are to be opened shortly to connect up Canton with Yunnanfu and Hongkong. A company already organized, with a capital of one million taels, intend to start operation throughout Yunnan Province, with headquarters at Yunnanfu. Contract has already been signed with an American firm for the purchase of five large commercial airplanes to be used in this service. Two airplanes to be delivered within sixty days and three planes in 180 days.

Proposed New Bridge Over the Haiho

Considerable prominence has recently been given by the Chinese Press in regard to the project of a new bridge over the Haiho. This proposed bridge, says the *P. and T. Times* was one of the projects which were first under consideration of the Haiho Conservancy Commission in November, 1926, and the discussion of which was later abandoned. The alternative projects consist of a tunnel, a drawbridge or a suspension bridge. The Chinese authorities are considering and examining the drawbridge project.

Mr. Wang Chun-fa, Director of the Public Works Department of the Tientsin Municipal Government, said: We have now under consideration the plans for a drawbridge proposed by the Haiho Conservancy Commission and will shortly submit our recommendation for its construction to the Municipal Government.

This bridge, if constructed, will be situated between the mouth of the Weitzee Creek and the Soochow Road in the ex-German Concession on this side and the ex-Russian Bund on the other side of the river. The width of the river in that part is about 330 feet and the proposed bridge should, when opened, allow passage of two steamers, in up and down directions, at the same time.

"The estimates for its construction, are about \$2,000,000. If the project is approved by the Municipal Government we may suggest that the necessary funds should be secured either by the issue of a municipal loan or some kind of a surtax along the same lines as the expenditure for the construction of the International Bridge, inasmuch as we expect to receive support from all sides owing to its importance to the port."

Proposed Bridge over the Whangpoo

Bridging the Whangpoo, may become a reality in the near future. Plans have been drawn for the construction of a steel highway bridge spanning the river in the southern section of Shanghai joining Nantao and Pootung.

That this stupendous scheme is now underway was learned recently through semi-official circles. It was also reported that a sum of \$5,000,000 has been raised both from government and private contributions.

The bridge, which will be situated to the south of Dah Moh Tao (Big Wharf), Nantao, will be 1,800 feet in length. It will be so built that it can be lifted when desired.

Toll will be collected from users of the bridge during the first two years after the completion of the bridge so as to refund the building cost contributed by merchants and residents here. The bridge will be entirely taken over by the government two years after it was built.

The scheme, which has as its aim to develop the large area of Pootung is said to be sponsored by Yao Chi-tung and Chao Lan-ting, and backed by, besides Kuomintang officials, local prominent merchants including I-ting Wang, Wang Ye-tse, Chu Wen-loh, Chang Yao-liang, Koo Hsing-ih, Yeh Wei-chun, Sheng Mao-hsiang, Yao Tse-shian, Yao Tse-shu and many others.



Philippine Shipping Revival

The New Inter-island Liner "Mayon"

THE new steamer *Mayon* of the Philippine Inter-island Steamship Co. inaugurated a new express service from Manila to Cebu, Zamboanga, Iloilo on October 31.

The steamer was built by Vickers Armstrong Ltd., at Barrow-in-Furness, England, and launched in June this year. She is 340 feet long between perpendiculars, moulded breadth of 50 feet 3 inches, and moulded depth to the Main Deck of 17 feet 9 inches. When loaded to 15 feet, she will have a deadweight of 1,500 tons. She has a sea-speed of 21 knots and will be maintained on a regular service of 18 knot schedule.

The *s. s. Mayon* is a three island type packet with crew quarters forward, first-class passenger accommodation amidship and deck passengers aft. She has accommodations for nearly 100 first-class passengers, 300 steerage passengers and 1,500 tons of cargo.

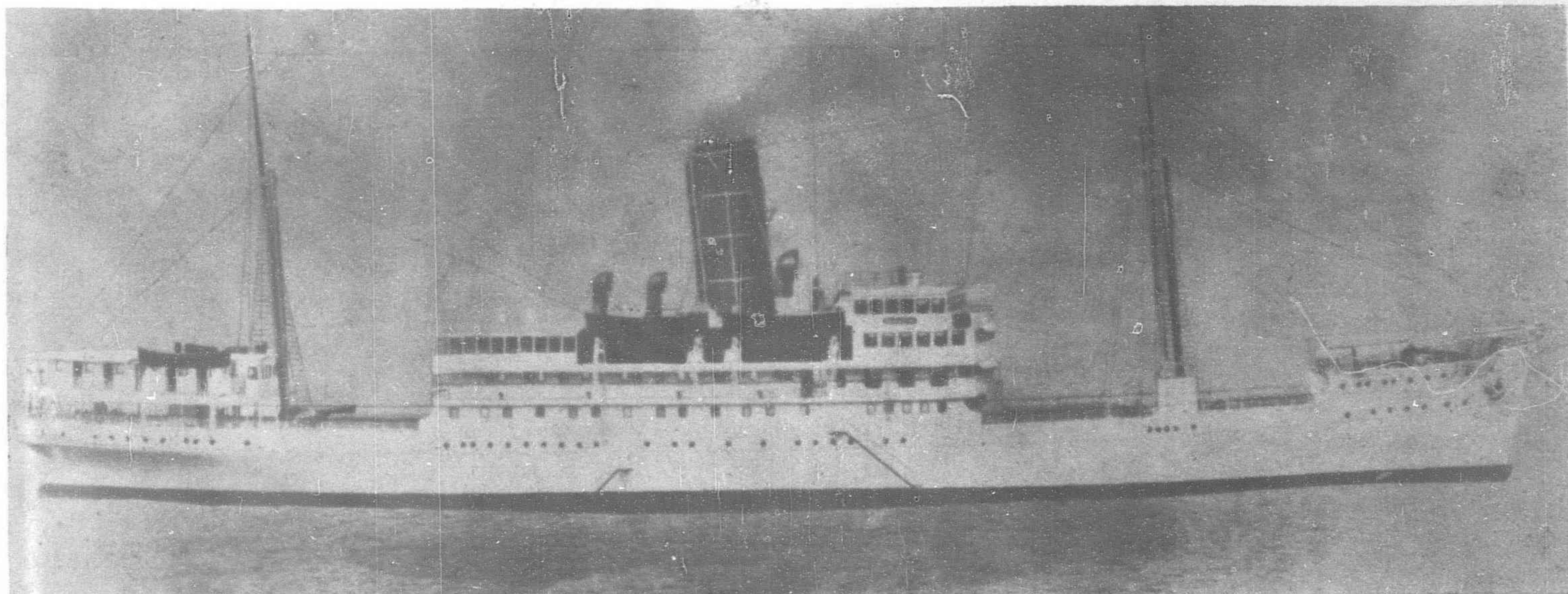
Accommodations throughout the ship are of the most modern design; staterooms having private bath and toilets predominate; staterooms are large and spacious, equipped with beds. All staterooms are outside and accommodate two people, have hot and cold

running water, in addition to call bells, reading lamps, wardrobes, thermos bottles, electric fans, etc.

A special innovation of the *Mayon* are 12 single staterooms to accommodate persons travelling alone and not wishing to share accommodations.

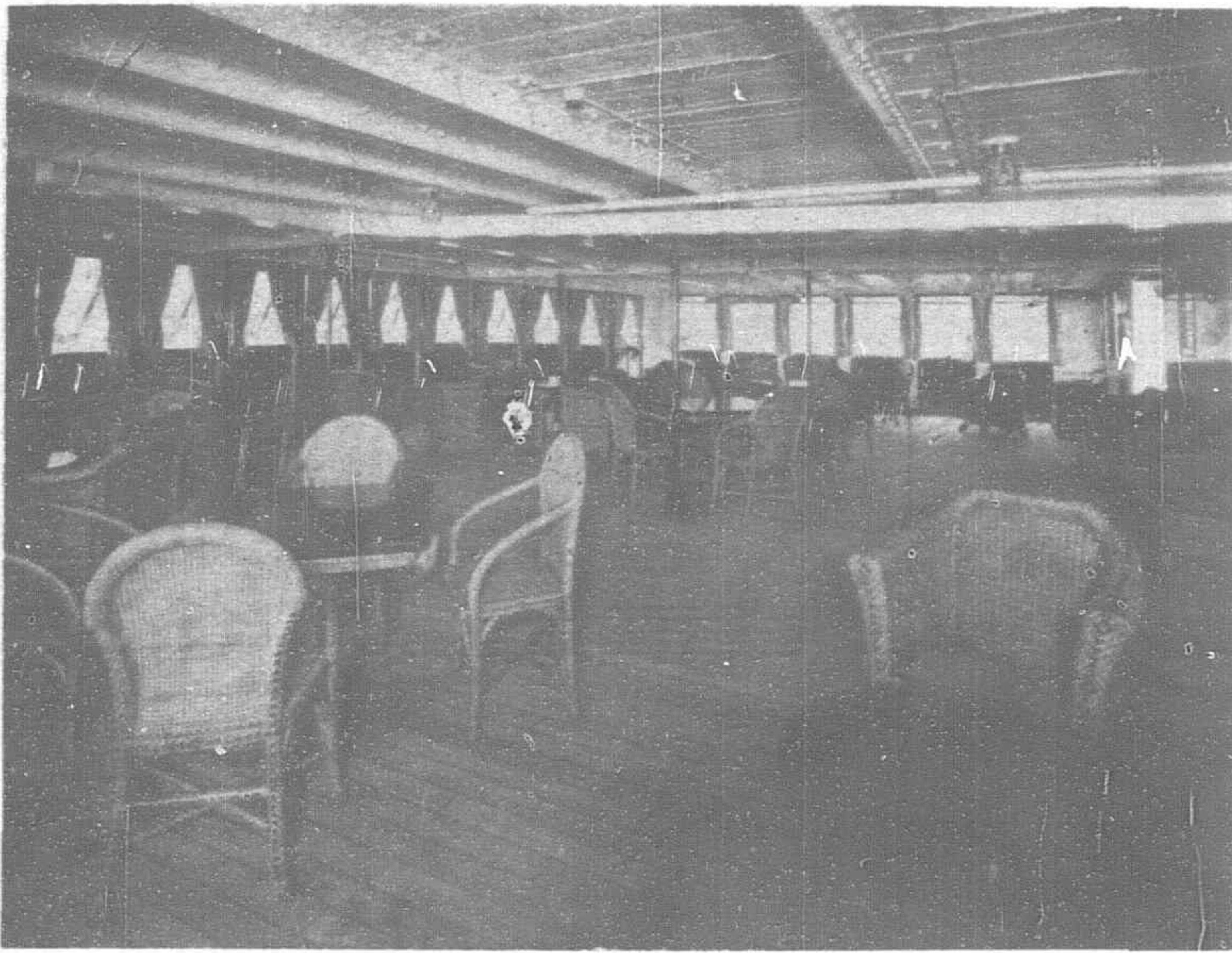
Three decks are devoted to first-class passenger accommodations. Under the bridge is the upper Lounge, a spacious cool and comfortable room extending the full width of the ship with windows facing not only the bow but both starboard and port sides. The furnishings and equipments of this Lounge are of a quality heretofore unavailable in inter-island travel in the Philippines. This Lounge will be fully furnished and with attractive Bilibid furniture. On this same deck are the smoking room, a beverage room and 12 single staterooms.

On the promenade deck is the lower lounge exquisitely furnished. This lounge may be cleared for special parties or for dancing. On this same deck is a suite consisting of a sitting room, bed room and bath room. The comfort obtained from such accommodations compare favorably with the finest Trans-Pacific steamer suites.

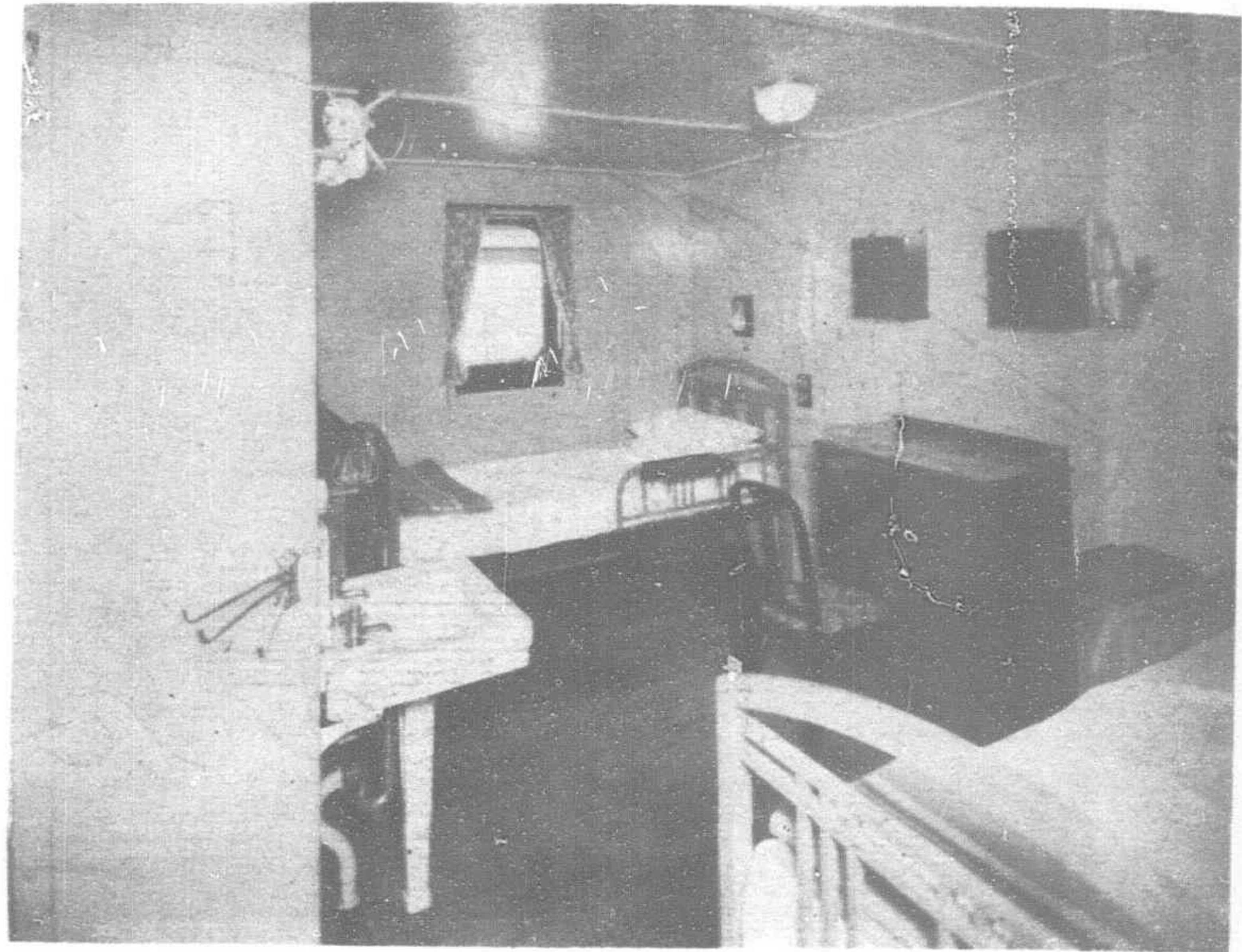


Philippine Inter-island Steamship Company's New Liner "Mayon"

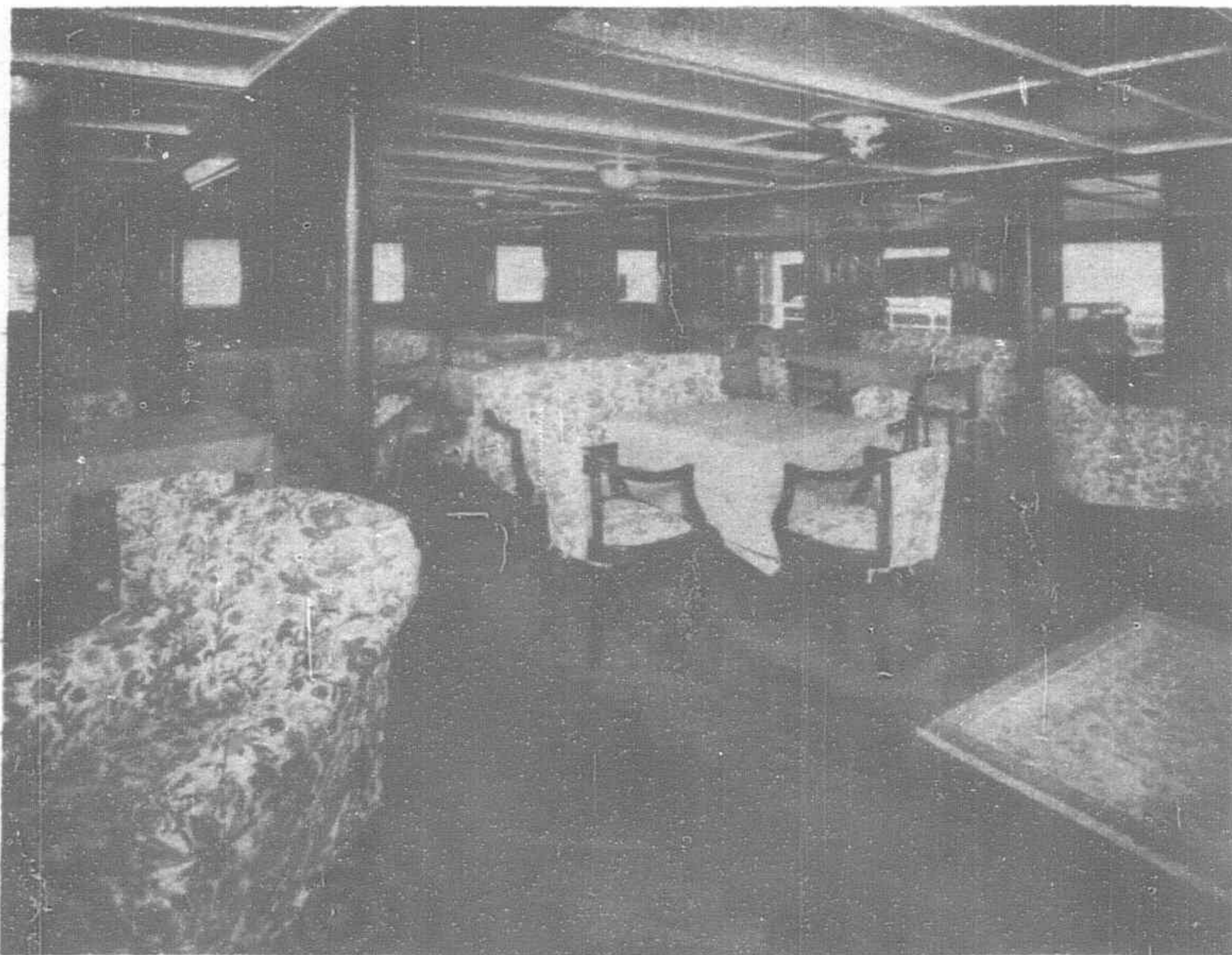
NEW PHILIPPINE INTER-ISLAND LINER "MAYON"



Upper Lounge



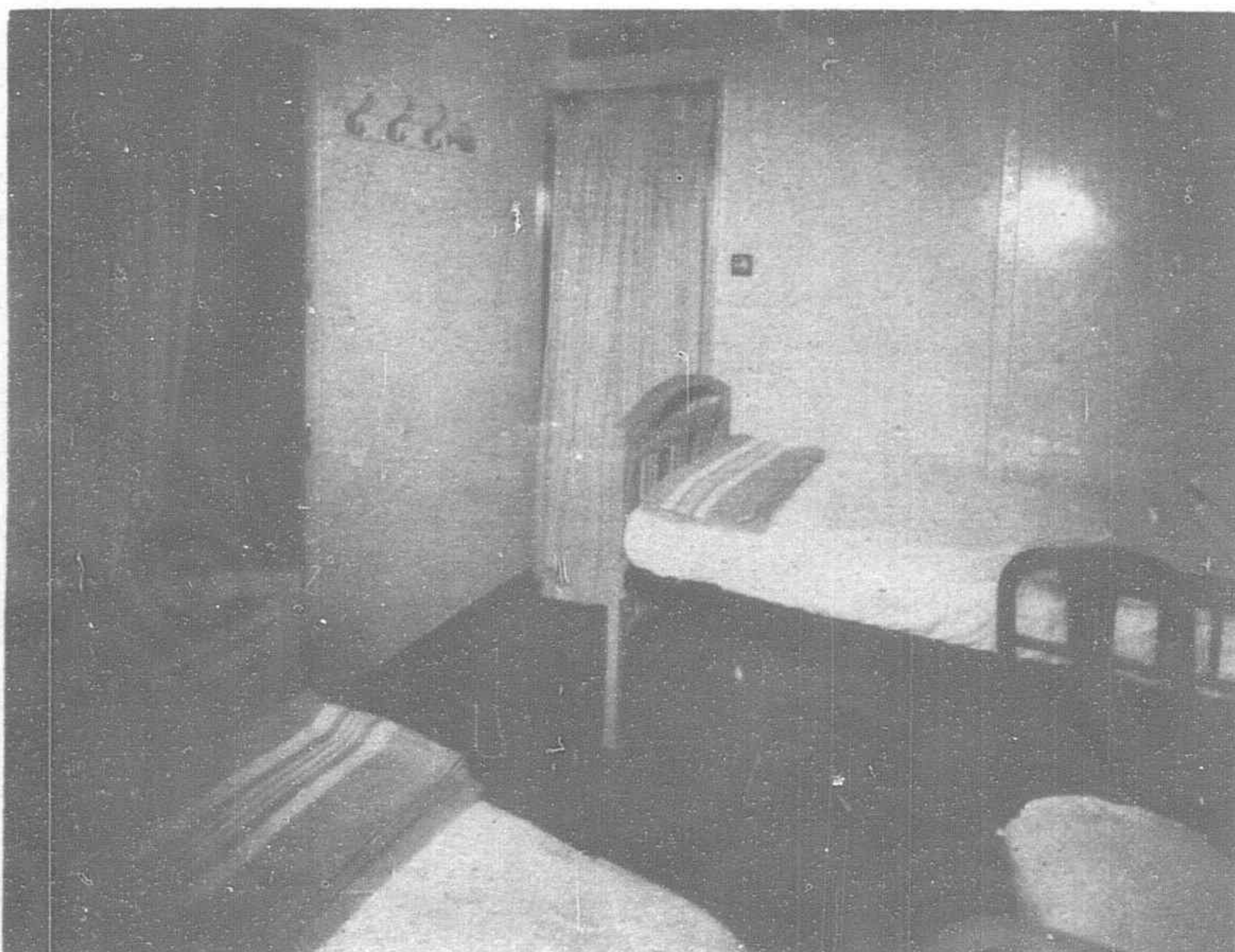
Double Stateroom—"A" Deck



Lower Lounge



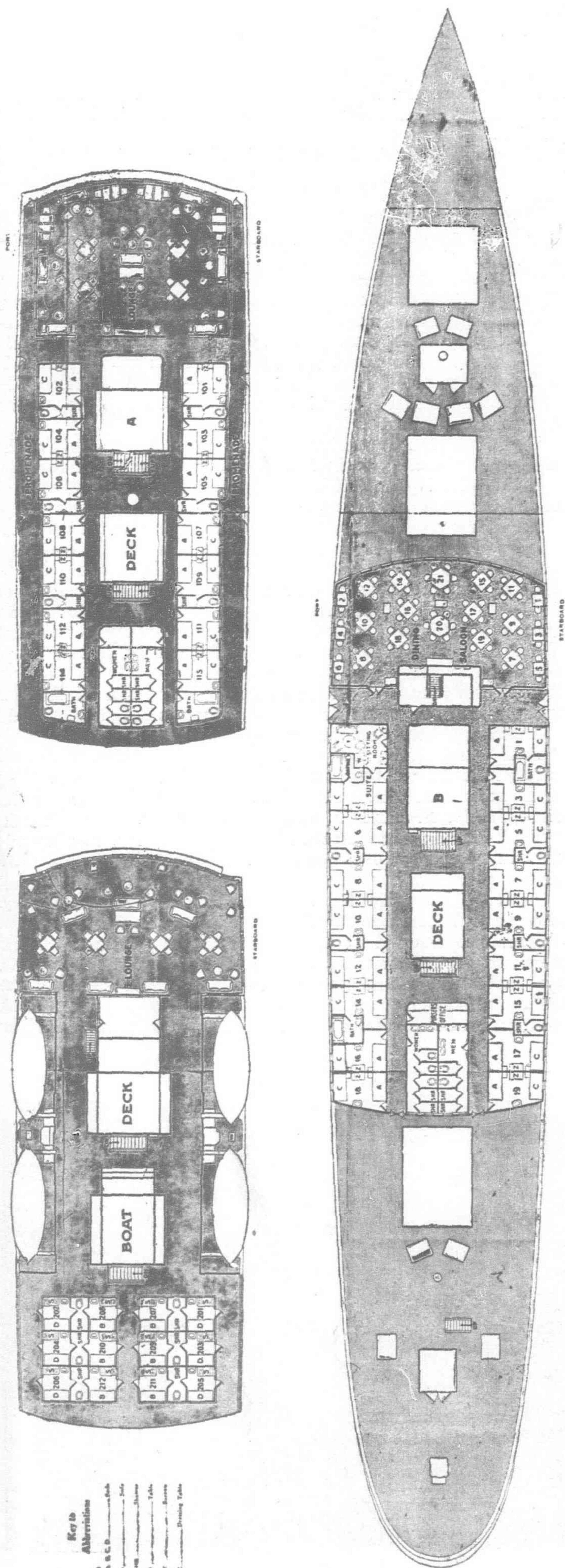
Dining Room



Stateroom—"B" Deck



Single Stateroom—Boat Deck



Deck Plans of the New Inter-island Liner "Mayon"

The owners and builders have particularly considered ventilation for the tropics, and the steamer has been so constructed as to take advantage of all natural ventilation. The ventilation system used is such that when the steamer is at her regular speed, the entire ship will be cooled to practically outside temperature.

The interior passenger quarters are all constructed of Philippine mahogany and teak. To aid in the coolness and comfort of the vessel, in addition to accommodations already described, there is an open promenade around the passenger accommodations on this deck.

On the main deck of the ship is a large dining room which will accommodate the entire first-class passenger list at one sitting.

The *s. s. Mayon* is propelled by twin screws driven by two sets of single reduction geared turbines, of the Parsons type, having 6,000 shaft horsepower. Each set of turbines combines high pressure and low pressure arranged in series. Steam is supplied by four Babcock and Wilcox water tube boilers working under a pressure of 220 pounds per square inch. The boilers are oil burners. Because of her turbine engines, the *s. s. Mayon* will be vibrationless which will add much to the comfort of the passengers. The *s. s. Mayon* has been built to comply with the latest specifications of Lloyds and the American bureau of shipping.

The *s. s. Mayon* will be under Philippine registry and operate on a weekly schedule from Manila alternately one week to Cebu, Zamboanga, Iloilo and return to Manila, the next week from Manila to Iloilo, Zamboanga, Cebu and return to Manila.

R. J. Harrison, President of the Philippine Inter-island Steamship Co. has announced that the Robert Dollar Co. has been appointed as managing agents.

The inauguration of a new service in inter-island shipping by the Philippine Inter-island Steamship Co. mark a new era in the history of Philippine shipping. The *s. s. Mayon*, has all the comforts and luxuries of modern ocean liners.

It has always been the policy of the insular government to promote inter-island shipping. The local shipping companies are co-operating in this regard. Lately, several new vessels were put on the regular run. Mention can be made of the *s. s. Bohol* of the Compania Maritima, formerly the *s. s. Syrius* of the Red Funnel Line. This vessel, with the exception of the *s. s. Mayon* which will shortly be put on the run, is the largest, finest and fastest of inter-island vessels.

Governor-General Dwight F. Davis, stressed the need for the development of inter-island shipping in his message to the Eighth Philippine Legislature on July 16, 1929 :

.... "In the Philippines, splendid progress has been made upon a comprehensive system of land communication by the construction of good roads. The completion of this system should be carried out as rapidly as funds permit. But another medium of communication, of vital importance in a country consisting of thousands of islands, a natural system of highways built by nature itself, the sea, has been seriously neglected. Other countries like the United States are spending enormous sums to develop their waterways. In the Philippines our laws have in some ways retarded rather than encouraged the development of inter-island shipping.

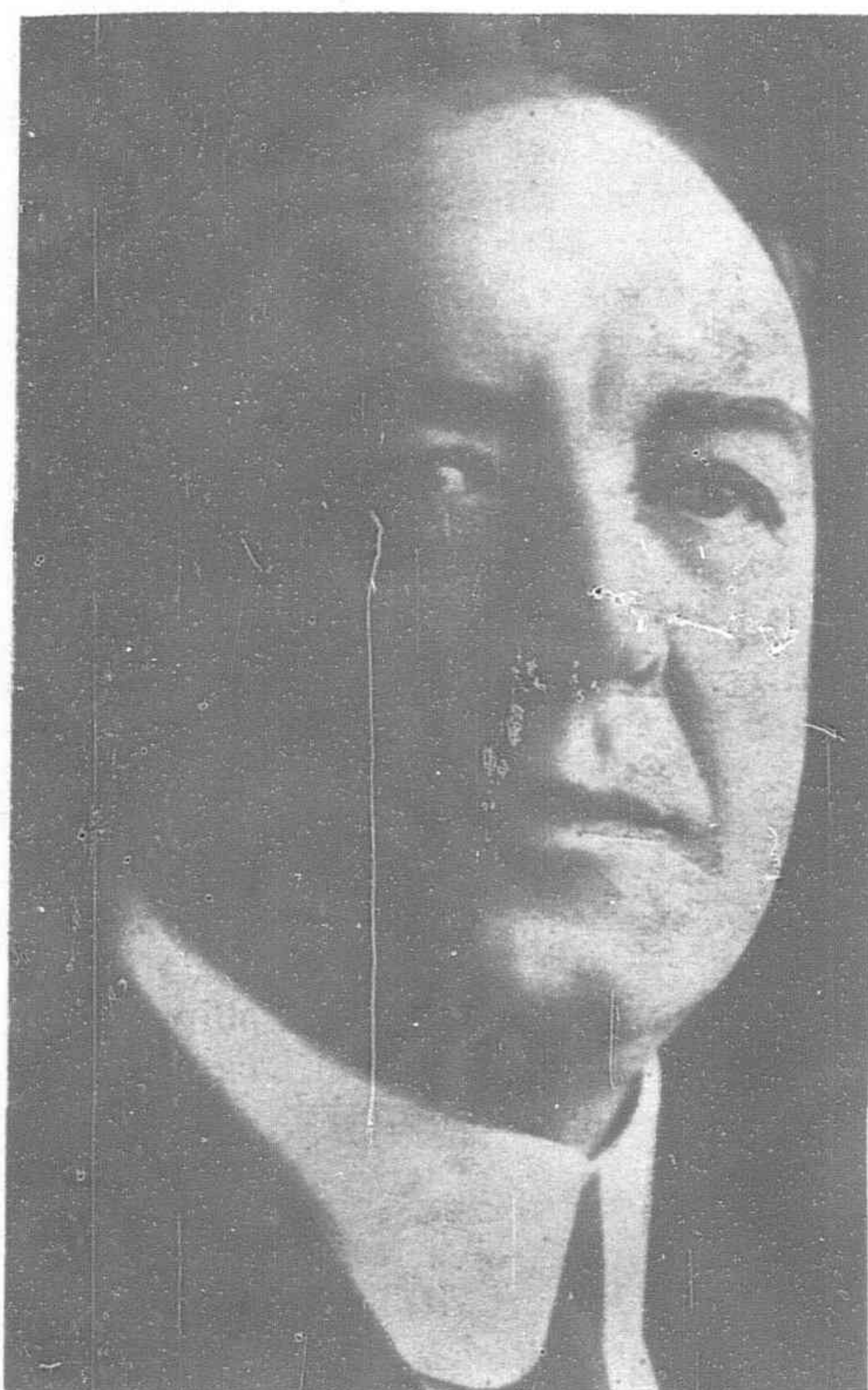
"Transportation is the life of trade. If its growth is stunted by restrictive laws, the growth of trade is stunted. If it is encouraged to expand, trade will expand. An adequate modern system of transportation by land, sea and air is essential to a healthy growth of both foreign and domestic trade."

The advisory committee appointed by the governor-general about two years ago to study the subject of inter-island shipping strongly recommended among other things important modifications in the law regarding the replacement of tonnage by certain foreign owned corporations.

In this connection, Governor-General Davis says in the same message : "The modifications (referring to the recommendations of the advisory board), with appropriate safeguards, for Filipino and American interest, would result in bringing immediately into inter-island shipping a considerable number of modern well-equipped vessels.

"If, however, the improvements which are taking place and which with proper encouragement, will take place in inter-island shipping are to be used to the best advantage, an adequate system of ports should be developed. . .

"The development of inter-island shipping and of ports is necessary in order that products of agriculture may reach the domestic and foreign markets expeditiously and cheaply."



Mr. R. J. Harrison, President of the Philippine Inter-island Steamship Company

For years Philippine shipping, frankly speaking, has been in a state none too satisfactory and desirable, and not until the sad lesson of the horrible Negros disaster was realized were important improvements introduced. The shipping service had been the subject of bitter criticisms during the agitation for a radical reform in the Philippine coastwise laws which however, were left intact as a result of the herculean efforts of the conservative members of the legislature.

The criticism was invariably made by advocates of new shipping laws to the effect that had shipowners been required to lay off their old vessels and equip the serviceable ones with modern conveniences and facilities, no human lives would have been lost.

The radical element was easily swayed into this side of the question and demanded changes in existing legislation to permit replacement of unserviceable ships. The conservatives, both in and out of the legislature, opposed the idea, holding that, in the name of national protectionism, native and American shipowners should be allowed continued monopoly on the coastwise trade, for they were in a position to improve the service.

Instead of liberal shipping legislation, the legislature in 1927 passed a law taking away from the public service commission the right and power to fix the routes but reserving its jurisdiction over matters of passenger and freight rates. Inter-island ships were also required to equip themselves with radio apparatus. These measures alone were sufficient to bring about needed improvement in the shipping service, it was then believed.

The results have truly been satisfactory. The prediction was not ventured in vain. A tangible proof is the Philippine coastwise trade has attracted one of Manila's most prominent citizens whose

business interest have been in the Philippines for the past 20 years. Mr. R. J. Harrison, President and Manager of Norton and Harrison whose optimism over the future of the Philippine shipping trade, has made possible the inauguration of the Philippine Inter-island Steamship Co. service with the arrival this week of the *s. s. Mayon* a modern passenger ship of the type best suited for local operation.

Doubtless, the shipping service has improved in many ways. The speed of steamers plying between Cebu and Manila and Iloilo and Manila has increased considerably.

The acquisition by the Manila Railroad Company of two passenger-freight ships—the *s. s. Naga* and the *s. s. Albat*—replacing its two old-fashioned ships, one of which ran aground last year, is an important asset to the shipping service. The railroad company's boats have all modern conveniences.

The Philippines is a maritime country where inter-island transportation is by water conveyances. It is felt that the establishment of an aerial line between Manila and the southern ports will not affect very much coastwise trade. In the first place, the contemplated-air taxicab service will be only an experiment as a commercial enterprise.

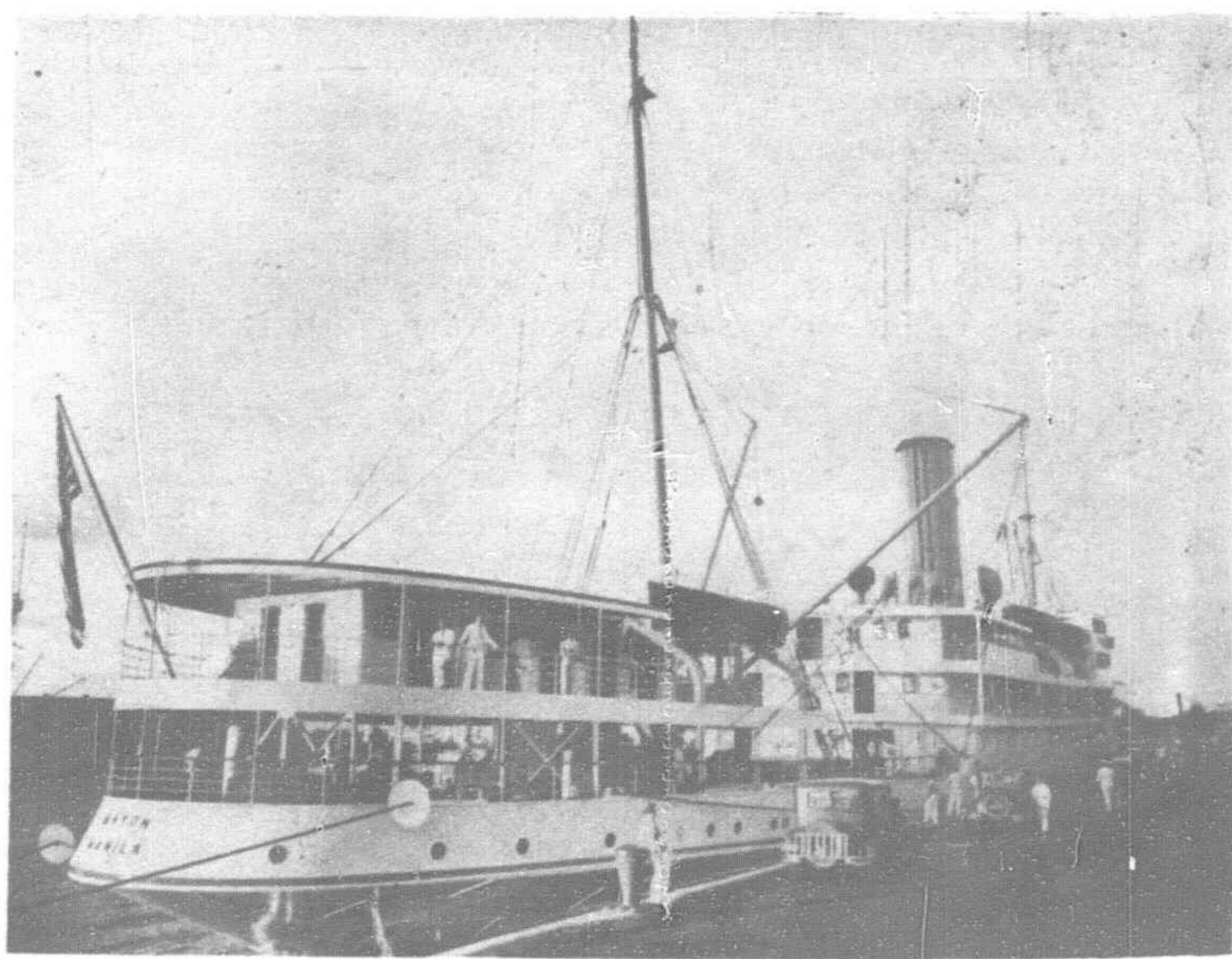
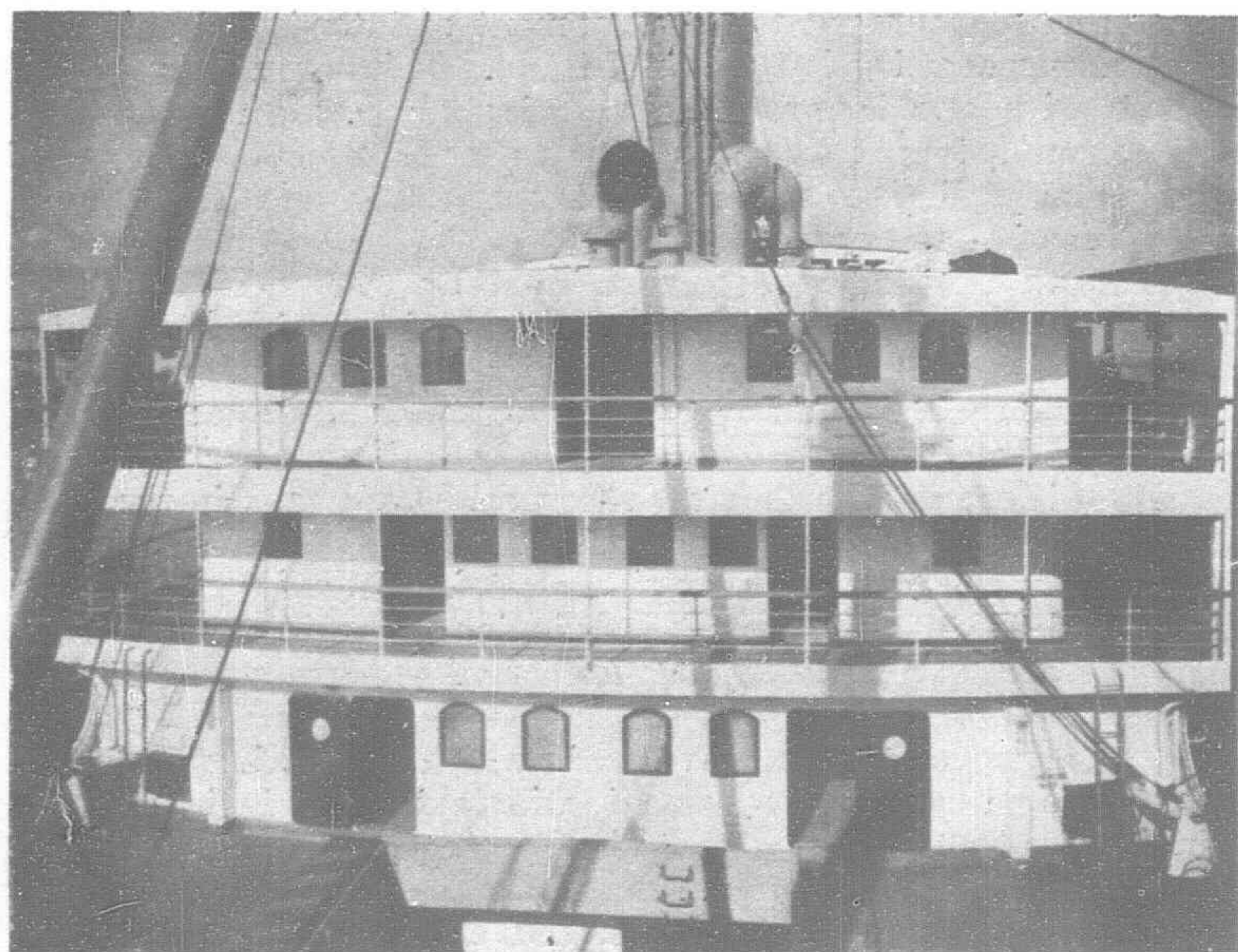
There is a plan to construct a new pier near the mouth of the Pasig to provide adequate berthing space for inter-island steamers. When this pier is completed, the Pasig river will be relieved of much shipping traffic, as entry of inter-island ships will be made impossible by the proposed bridge to connect port area with the Tutuban railroad station. According to public works officials, the bridge will not be built until after the completion of the new pier.

Cebu and Iloilo now have modern port facilities consisting of concrete piers. Davao and Zamboanga have also adequate facilities to accommodate both inter-island and ocean-going vessels that call periodically at those ports. Legaspi, another port of entry, is constructing a new pier.

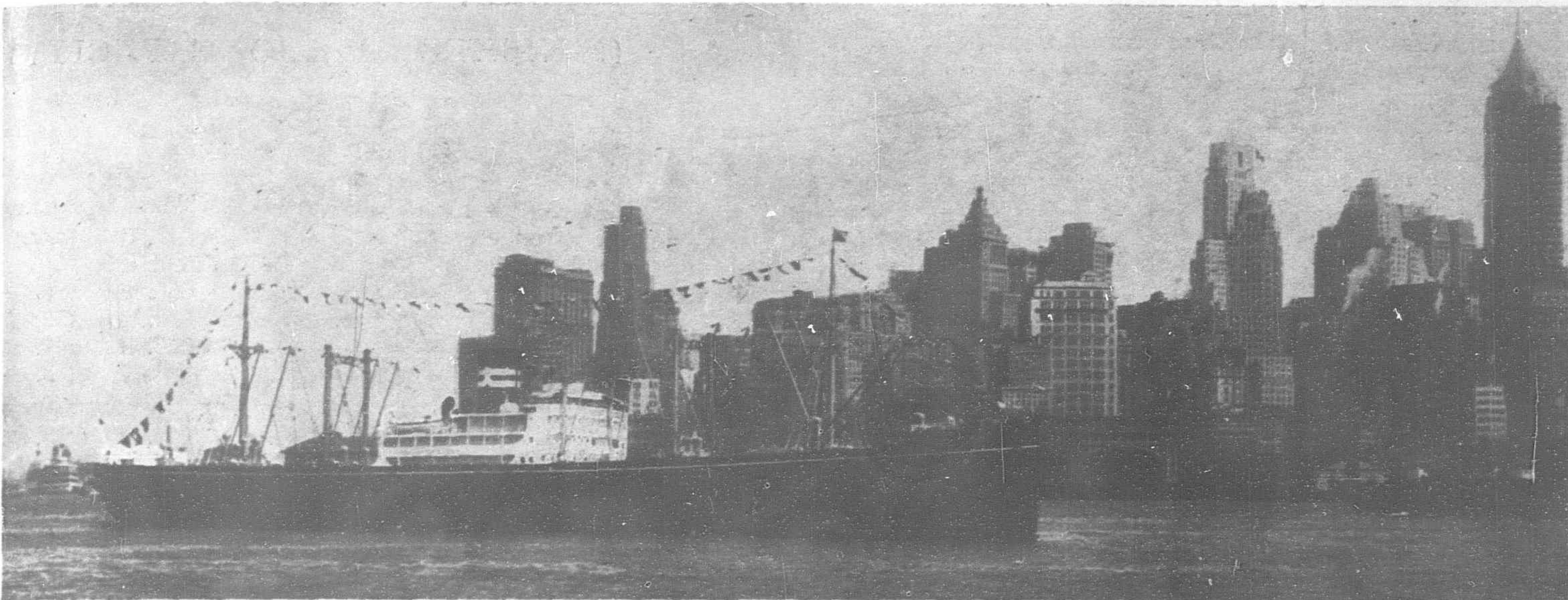
With the inaugural sailing in Philippine waters of the new steamship *Mayon* October 31, the names of two already well-known brothers must necessarily come to the fore of public attention again. They need scarcely any introduction, since their long stay in the Islands and their close association with both Filipinos and Americans here, have made R. J. Harrison, and his younger brother, Mr. H. H. Harrison, very popular figures.

The Philippine Inter-island Steamship company, was incorporated as far back as 1925, but had not actually done any active business.

The *s. s. Mayon* is the first ship acquired by the company. The company's purchase of other boats, according to Mr. H. H. Harrison, depends upon the result of the *Mayon's* venture. Should the company find that the people here patronize high class boats, they would purchase others for the inter-island service. The company, though, is very hopeful that the people will respond to the need of the class of service which boats like the *Mayon* offer.



Dollar Liner "Mayon" Alongside Manila Wharf



The O.S.K. Express Motor Cargo Vessel "Kinai Maru" Off the Battery at New York, August 11, 1930

The O. S. K's. Orient-New York Express Motor Cargo Liners

THE Orient—New York Line of the Osaka Shosen Kaisha will be reinforced by adding new six high speed motor cargo liners, the *Kinai Maru*, *Tokai Maru*, *Sanyo Maru*, *Hokuroku Maru*, *Kwanto Maru* and *Kwansai Maru*. The *Kinai Maru* and *Tokai Maru*, completed at Nagasaki Works of the Mitsubishi Zosen Kaisha, are already running on their maiden trips, while the *Sanyo Maru* and *Hokuroku Maru* are under construction at the same works, and the *Kwanto Maru* and *Kwansai Maru* are now being fitted at the Yokohama Dockyard in Yokohama. The former four boats are specially designed by the Owners to meet every requirements and convenience for their service. The latter two are slightly different in principal particulars.

As the result of the Owners brisk and ever progressive enterprise and with the hope of acquiring the blue ribbon on the Pacific among this class of vessels, the enterprise has been well awarded when the *Kinai Maru*, the first of this fleet, made an outstanding success by crossing the Pacific from Yokohama to Los Angeles in 11 days and 6.5 hours and to New York 25 days and 17 hours. With such a record speed her every convenience for complete cargo handling appliances, safety of ship with CO₂ fire extinguishing equipment, comfort provided for crew, together with the well proportioned appearance, we may say she is the last word of supreme cargo liners on the Pacific now afloat.

The keel was laid on October 1, 1929, launched on April 1, 1930 and completed on June 14, 1930. The principal particulars are as follows :—

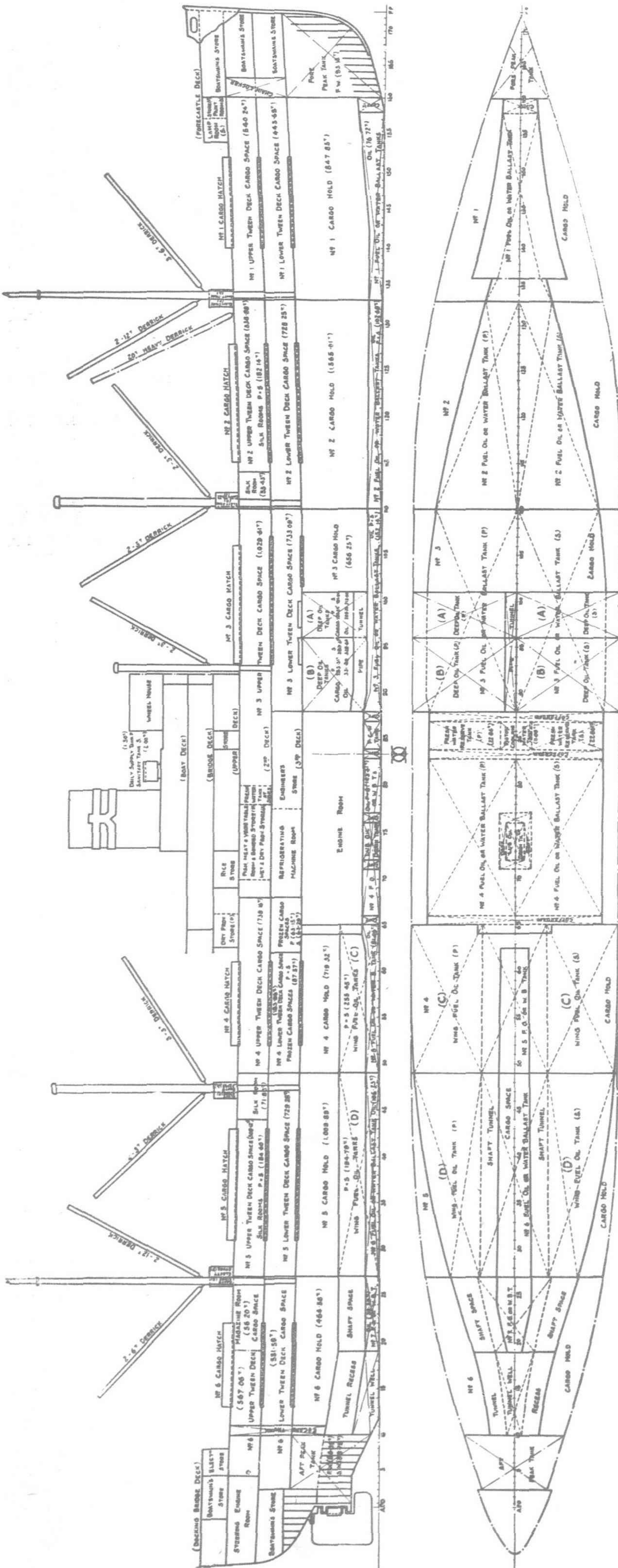
Length over all	.. .. .	463-ft. 6-in.
Length between perpendiculars	.. .. .	445-ft. 0-in.
Breadth moulded	.. .. .	60-ft. 6-in.
Depth moulded	.. .. .	40-ft. 9-in.
Load draught	.. .. .	28-ft. 2-in.
Gross tonnage	.. .. .	about 8,400 tons
Dead weight	.. .. .	.. 10,000 ..
Cargo capacity, bale, (including frozen, silk cargoes and deep cargo oil tanks) ..	.. .. .	.. 14,300 ..
Speed	.. .. .	18 knots.
Propelling machinery	.. .. .	2 sets Mitsubishi-Sulzer single acting Engines
Brake Horse Power, normal	.. .. .	7,200

The vessel was built under the special survey of Lloyd's and Japanese Ministry of Communication and is classed by Lloyd's as 100 A1, " with freeboard " and L.M.C. and also as the first class ocean-going vessel by the Japanese Government.

She has two upright masts and two twin masts, and one big elliptical funnel and rigged as a fore and aft schooner, the stem being slightly raked, while the stern is of cruiser type, which conform nice appearance and good composition. She is a complete super structure vessel having three continuous decks, viz. upper, 2nd, and 3rd deck, and also a forecastle ; a bridge deck on upper deck nearly amidships, and a boat deck above it. The deck house on upper deck is allotted to the accommodation of crew, while the bridge deck house affords the accommodation of officers and engineers, dining saloon, and mess room, etc. Captain's day and night rooms, chart room, wireless telegraph office, and two state rooms are arranged on boat deck forward, and wheel house on navigation bridge deck.

The vessel is subdivided by eight water-tight bulkheads all extending to 2nd deck, except collision bulkhead which reaches up to upper deck, into a fore peak tank, Nos. 1, 2 and 3 holds, the Engine room, Nos. 4, 5 and 6 holds and an aft peak tank. Between 2nd and upper decks there are arranged fire-resisting bulkheads in way of each water-tight bulkhead. Four deep cargo oil tanks of aggregate capacity of about 1,100 tons are arranged at after end of No. 3 hold, each tank having capacity of 200 tons to 300 tons. Fuel oil is stowed in the tunnel side tanks of Nos. 4 and 5 holds and in the double bottom, the total capacity being about 2,000 tons. Four frozen cargo chambers of total capacity more than 300 tons are arranged in No. 4 lower 'tween deck, and six silk rooms of aggregate capacity of about 860 tons, the smallest room of 55 tons and the largest of 185 tons in capacity, in Nos. 2 and 5 upper 'tween deck, and one magazine compartment of about 60 tons capacity in No. 6 upper 'tween deck. Ship can carry any kinds of oil in deep cargo oil tanks, and any kinds of frozen cargo in cold chambers.

For cargo handling arrangement, an exhaustive study was made for rapid, convenient and economical disposal of various kinds of cargoes which the vessel deals with. She has six extra large cargo hatchways, the breadth of 20-ft. 0-in. and the length of each hatchway being 27-ft. 0-in., 35-ft. 9-in., 35-ft. 9-in., 24-ft. 9-in., 33-ft. 0-in. and 24-ft. 9-in., of which three forward of midship



M. S. "KINAI MARU" (FINISHED CARGO CAPACITY)

Item Bottom of Beams
(40 Cubic Feet Per Ton)

No.	1 Hold	Tons	c.f.t.
1	847.85	(33,914)
2	1,565.01	(62,600)
3	656.25	(26,250)
4	719.32	(28,773)
5	1,009.89	(40,396)
6	464.58	(18,583)
Total	5,262.90	(210,516)

No.	1 Upper Tween Deck	Tons	c.f.t.
1	540.24	(21,610)
2	338.88	(13,555)
3	1,029.61	(41,184)
4	738.16	(29,526)
5	308.12	(12,325)
* 6	628.90	(25,156)
Total	3,583.91	(143,356)

No.	1 Lower Tween Deck	Tons	(c.f.t.)
1	443.69	(17,748)
2	728.25	(29,130)
3	733.09	(29,334)
4	183.96	(7,358)
5	729.28	(29,171)
6	531.59	(21,264)
Total	3,349.86	(133,995)

Aggregate 12,196.67 (487,867)

Deep Tank Space	Tons
Fore (Port Side)	208.20 (per ton of 38 c.f.t.)
.. (Starboard)	212.60 (" ")
After (Port Side)	331.60 (" ")
.. (Starboard)	338.60 (" ")
Total	1,091.00 Tons

Silk Room	Tons	(c.f.t.)
Fore (Port Side)	182.14	(7,286)
.. (Starboard)	182.14	(7,286)
.. (Center)	55.43	(2,217)
After (Port Side)	184.60	(7,384)
.. (Starboard)	184.60	(7,384)
.. (Center)	71.80	(2,872)
Total	860.71	(34,429)

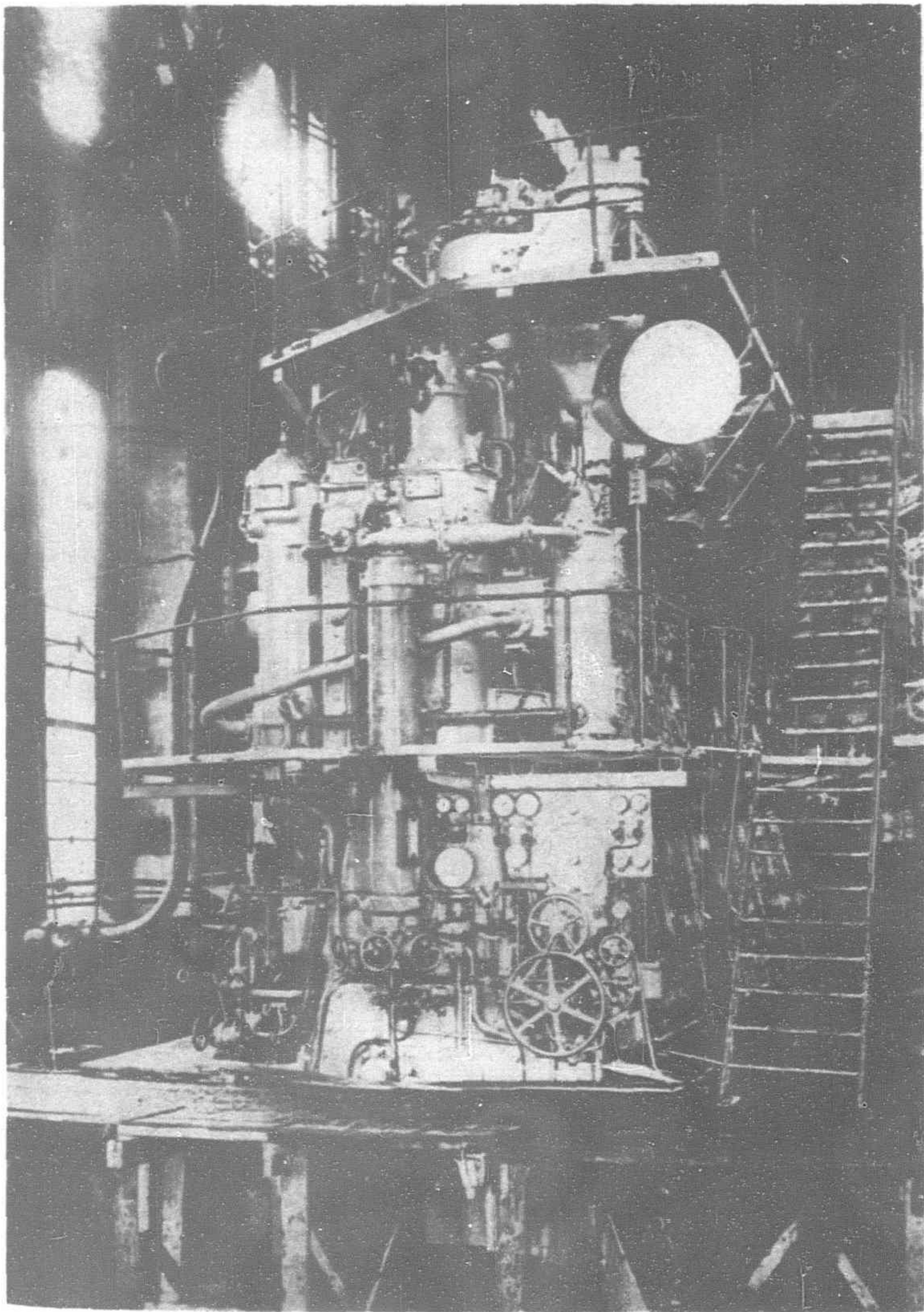
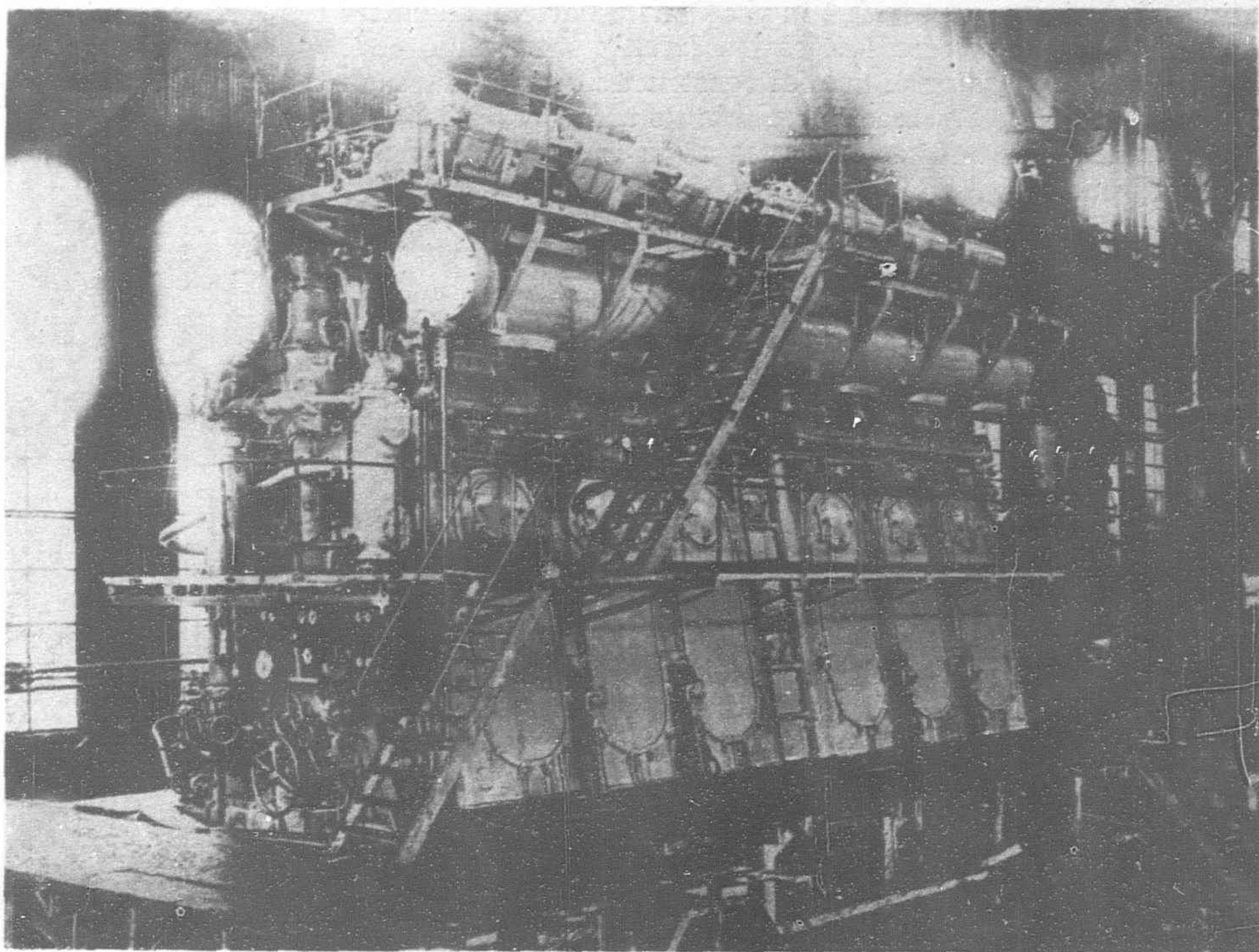
Frozen Cargo Space	Tons	c.f.t.
Fore (Port Side)	63.15	(2,526)
.. (Starboard)	63.29	(2,532)
After (Port Side)	87.57	(3,503)
.. (Starboard)	87.57	(3,503)
Total	301.58	(12,064)

* Magazine Compartment.
50.00 Tons (included in the space of No. 6 Upper Tween Deck).

deck house and three aft, and twenty electric cargo winches, all arranged on upper deck. All cargo winches are of the Mitsubishi standard make having automatic load discriminators, nine of which are of 5-ton lifting capacity at 130 feet per minute and eleven of 3-ton capacity at 100 feet per minute. Twenty-one Mannesmann solid drawn steel derricks are fitted on fore and main masts, twin masts, and derrick posts and arranged as under.

Hatch No.	Mast	No. of Derrick	Lifting Capacity
No. 1 Cargo hatch	Fore mast	3	6 tons
" 2 "	" "	1 (heavy)	20 "
" 2 "	" "	2	12 "
" 2 "	for twin mast	2	3 "
" 3 "	" "	2	3 "
" 3 "	derrick posts	2	3 "
" 4 "	aft twin mast	3	3 "
" 5 "	" "	2	3 "
" 5 "	main mast	2	12 "
" 6 "	" "	2	6 "

Considering her very high speed, special attention was paid in the design of her form to obtain the least resistance, and numerous experiments were carried out by the Mitsubishi experimental tank before the final ship form was decided; also special attention being paid for the form "abaft the propeller" and the



Front and End Views of "Kinai Maru's" Engines. Two Sets Single Acting Two Cycle Mitsubishi-Sulzer Diesel Engines, 7,200 b.h.p. at 120 r.p.m.

stream-line form was adopted to her rudder and shaft brackets, thus attaining the very satisfactory results on speed as shown in the annexed trial results, and also in actual performance as already stated.

Also precaution was taken, particularly in the construction, in order to prevent vibration, the height of the double bottom under the engine room is considerably increased and extra longitudinal side girders are provided, while many web frames are fitted in the Engine room at every four or five frame spaces apart, which resulted in complete abolition of vibration.

For fire extinguishing appliances, a complete system of Co_2 fire annihilating device is provided, the 80- Co_2 liquid bottles are stowed in midship house and all over piping for each and every cargo spaces throughout the ship is led fore and aft with respective manifold station.

The ship is carefully constructed rat proof, according to the recommendation by the Public Health Bureau of the United States of America.

The deck machinery comprises a Clark Chapman's electric windlass, a Brown Brother's electric-hydraulic steering engine and two sets of the Seager type multi-effect Co_2 refrigerating machinery manufactured by the Kobe Steel Works, Kobe. In addition, ship is equipped with a gyro-compass of the Sperry type, self steerer and course recorder, all made by the Tokyo Keiki Seisakusho, Telefunken radio direction finder, wireless telegraph installation, etc., complete.

The ship is equipped with two sets of Single Acting Two Cycle Mitsubishi-Sulzer Diesel Engines, capable of developing normal output of 7,200 b.h.p. when running at 120 r.p.m.

Each engine has six working cylinders of 680 mm. in diameter with 1,200 mm. stroke, and drives directly one injection air compressor. All other auxiliaries for main engines are electrically driven and two sets of each kind are provided, so that one may always be standby.

Scavenging air for the main engines is supplied by B.B.C. Turbo-blowers, each having a capacity of 1,000 cubic meters of air per minute. The cooling water pumps are of the Mitsubishi Centrifugal type, each comprising a Jacket cooling sea water pump and a piston cooling fresh water pump, driven by a motor placed in between, corresponding capacity of water supply being 300 and 65 cubic meters per hour respectively.

The fresh water is first drawn up from the piston cooling water collecting tank by the piston cooling fresh water pump and after passing through fresh water cooler injected as a free jet through Sulzer patent piston cooling gear, to piston crown, thence the heated water flows by gravity down into the oil separating tank and subsequently flows back to the collecting tank. The lubricating oil pumps each comprising one bearing oil pump and a cross-head oil pump, having capacity of 52 and seven cubic meters respectively, are also driven by a motor arranged in between. Lubricating oil is first drawn up by the bearing oil pump from a lubri-

cating oil drain tank provided in the double bottom, and after the air bubbles injurious for lubrication having been removed from the oil by air separator of special construction passes through the oil cooler, and mostly reaches rubbing surface of main bearings and crosshead guides whereas a part of oil is sucked by the cross-head oil pump.

The electric source is generated by three 260 kw generating sets each driven by the Mitsubishi four cycle airless injection Diesel Engine having six cylinders developing an output of 390 b.h.p. at 340 r.p.m. For injecting the fuel into the working cylinders Vickers' patent airless injection system is adopted with result that working conditions proved to be far more satisfactory than that may be obtained by any other type of airless injection Diesel Engine.

These dynamo engines will be followed by nine identical units of the sister ships, while six motors of the same size are now satisfactorily running on board the O.S.K. passenger liners the *Buenos Aires Maru* and the *Rio de Janeiro Maru* now engaged in the Japan-South American service.

For starting and reversing the Main Engines, five high pressure air bottles each having a capacity of 2.5 cubic meters, 70 atmospheres and two low pressure ones, each of six cubic meters 32 atmospheres, are provided. For the purpose of replenishing those starting air two Mitsubishi-Sulzer auxiliary air compressors direct coupled with a motor of 200 b.h.p. are provided. The starting air can also be replenished from injection air compressors of main engines, so that no shortage of starting air may possibly be experienced while manoeuvring the vessel.

For starting the generating sets, a starting air bottle of 272 litres, 32 atms. and an emergency air compressor driven by six h.p. hot bulb engine is provided to meet such an emergency that no reserved air is available.

In the rear part of the engine room, a Cochran oil-fired boiler, 1,400 mm. in diameter, 3,500 mm. in height, 100 lbs. pressure per

sq. inch is installed, supplying steam for cooking and heating purposes.

Following electrically driven auxiliaries are installed in the engine room.

Description	No.	Type	Capacity
Lubricating oil shifting pump	1	Gear type	2.5 cub. m. per hour
Fuel oil transfer pump	2	"	50 cub. m. " "
Fuel oil service pump	2	"	2.5 cub. m. " "
Fuel oil purifier	3	Shaples type	350 gallons " "
Lubricating oil purifier	2	"	350 " " "
Bilge and Ballast pump	1	vertical centrifugal	110 tons " "
Fire and General service pump	1	"	110 " " "
Bilge and Sanitary pump	1	Piston type	30 " " "
Engine room ventilating fan	2	Mitsubishi FOL 70 type	1400 cub. ft. per min.

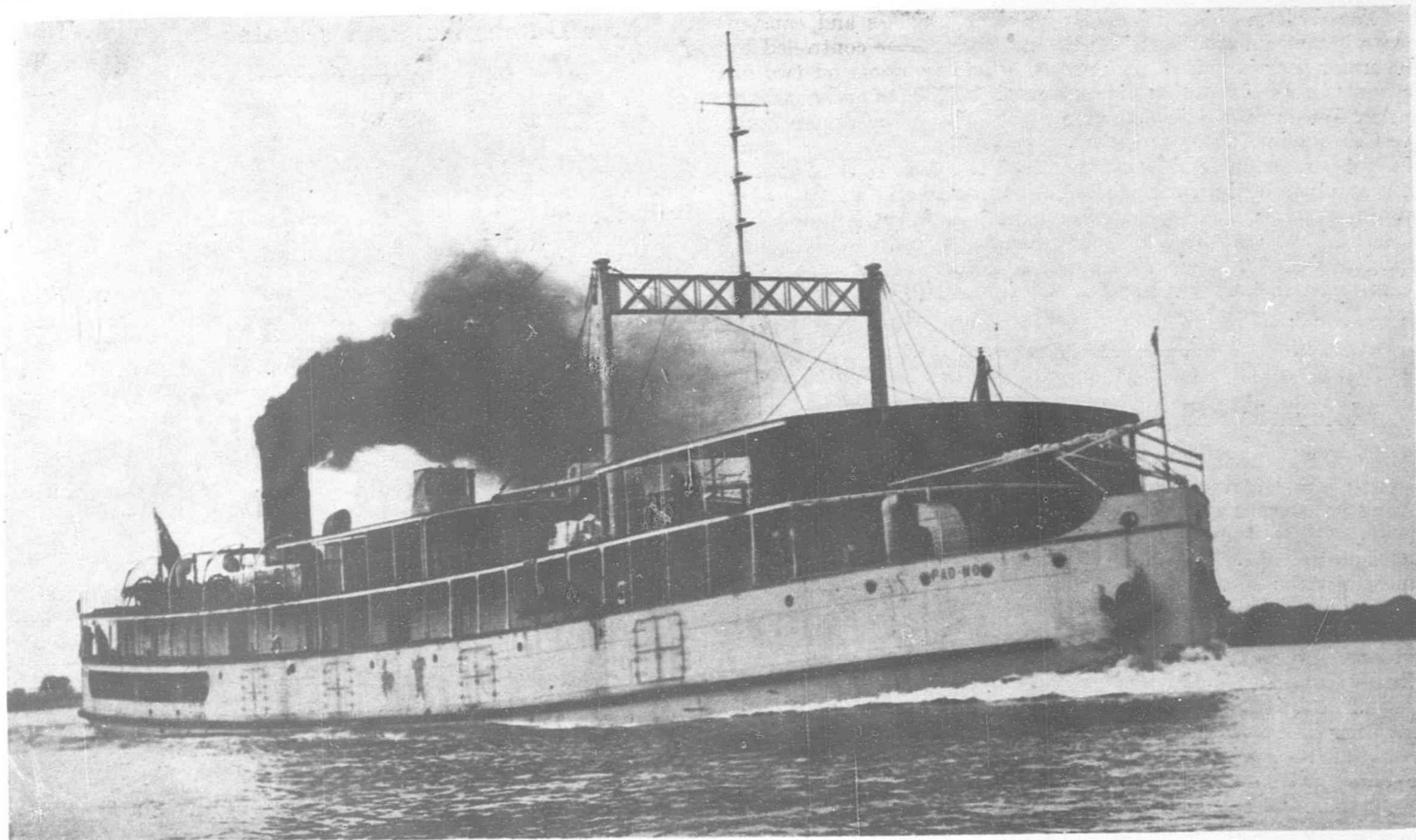
Various sea trials of the vessel were carried out off the Nagasaki harbor on June 2, 3, and 7, 1930. The full speed trial was carried out on the 2nd with consecutive runs on the measured course of three miles and a mean speed of 18.44 knots, at the average b.h.p. 8,262, were recorded. In the fuel consumption trial carried out for six hours on June 3, a figure of 172.9 grams per b.h.p. per hour was obtained. In the above full speed trial, mean indicated pressure of main engines reached as far as 6.74 kgms. with piston speed of 5.2 meters per second and yet the burning condition proved to be very satisfactory. The most satisfactory results above stated may chiefly be attributed to the Sulzer's patent scavenging method dividing the scavenging ports into upper and lower rows and thus enabling the engine to be supercharged, controlling the upper row by the automatic valves.

The sister boats *Sanyo Maru* and *Hokuroku Maru* will be completed in the month of October and November, and the *Kwanto Maru* and *Kwansai Maru* in September and December of this year. The Osaka Shosen Kaisha will execute an express service between Orient and New York by these vessels early in the next year.

Ship No. 471 "Kinai Maru" Summary of Sea Trial Results

Place	Off Miye	Off Miye, Nagasaki					Off Miye
Date of Trial	June 2, 1930	June 5, 1930					June 7, 1930
Kind of Trial	Official Full Speed Trial	Progressive Trial { Full Power Trial					Fuel Consumption Measuring Trial
Draught {	Fore	17'-9 $\frac{1}{8}$ "					16'-10 $\frac{1}{8}$ "
	Aft	22'-4"					20'-11"
	Mean	20'-0 15/16"					18'-10 15/16"
Trim by the Stern	10'-2 $\frac{1}{2}$ "	4'-6 $\frac{1}{8}$ "					4'-0 $\frac{1}{8}$ "
Displacement (in tons)	7.097	1.0547					9.872
Weather	Blue cloudy	Cloudy					Cloudy
Condition of Sea	Slight	Slight					Smooth
Direction and Force of Wind	NW-3	NW 3-4					
Kind of Load	115%	4/4	3/4	1/2	1/4	4/4	4/4
Ship Speed Knots	18.438	17.335	16.086	13.975	11.101	17.341	
Slip per cent.	5.1	6.6	5.3	4.3	2.8	6.7	
Engine Speed R.P.M.	130.0	124.1	113.6	97.7	76.4	124.2	124.1
Mean Indicated Press KG/CM ²	6.74	6.39	5.28	4.06	2.84	6.45	6.36
I. H. P.	10159	9189	6952	4599	2518	9268	9167
B. H. P.	8262	7420	5475	3409	1654	7489	7399
Dynamo Engine output in kw	444.0	379.0	316.9	286.4	287.8	366.3	358.8
Power Required For Necess. Aux. Drive Main Eng To (kw)	Turbo Blower	288.2	275.0	220.0	195.8	198.0	252.2
	Jacket and Piston C.W. Pump	30.8	41.8	29.2	25.3	25.3	44.4
	Lubricating Oil Pump	19.8	20.6	20.2	20.2	20.6	20.8
	Total	338.8	337.4	269.4	241.3	243.9	317.4

Fuel oil used during trial : Tarakan Oil Calorific value 10381 Cal/KG.



The New Steel Twin Screw Steamer "Pao Wo" designed and built by the Shanghai Dock and Engineering Co., Ltd., for the Yangtze Service of the Indo-China Steam Navigation Co., Ltd.

The "Pao Wo"; A New Yangtze River Steamer

THE Indo-China Steam Navigation Co., Ltd. has had completed to their order the steel twin screw Steamer *Pao Wo* designed and built by the Shanghai Dock and Engineering Co., Ltd. specially for Mid River service on the Yangtze and classed to Lloyds full requirements for the service intended.

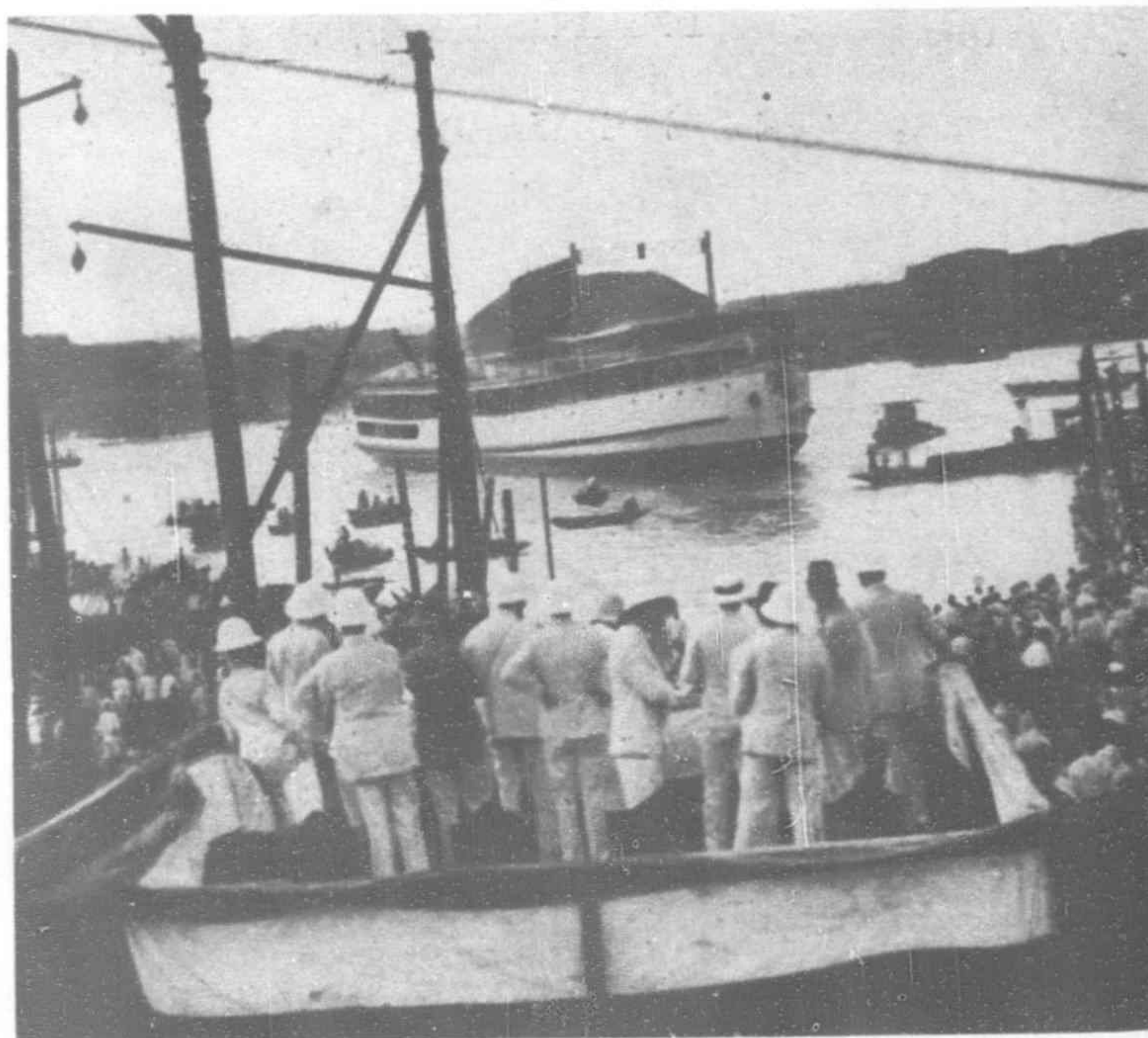
The *Pao Wo* is a distinct advance in vessels on the same trade and has large carrying capacities on light draught. With steam up and ready for service she carries 700 tons deadweight on 6-ft. 2-in. draft and on the Official trial when loaded with 1,487 tons deadweight and a draft of 8-ft. 5½-in. she attained an average mean speed of over 12 knots on the measured mile runs and was in all respects entirely up to the Owner's highest expectations. The hull is designed on stream line principles as far as practicable and the two stream line rudders fitted by the Builder's of their own design contributed greatly to the high speed attained.

The general finish of the vessel and machinery is up to the Owner's usual high standard and Builders practice. The saloons and passenger accommodation for 12 first class, 20 intermediate class and 122 third class passengers embodies all the latest improvements,

including electric light and fans, steam and electric heating, hot and cold fresh water service. An electric driven cold storage and ice making plant is installed for ship's general service. The captain and officers, purser, pilots, military guard and wireless operators accommodation is placed on the bridge deck, very roomy and well finished with all modern fittings.

The vessel's length overall is 292-ft. 0-in., length between perpendiculars, 280-ft. 0-in., Breadth moulded, 48-ft. 0-in., Depth moulded to main deck, 10-ft. 0-in. and 18-ft. 0-in. to upper deck. The loaded draft is 9-in. 1-in. and the vessel carries 1,700 tons deadweight at this draft in fresh water.

The Propelling machinery built by the Dock Company is placed aft and consists of two sets of Triple expansion surface condensing engines with cylinders 13½-in.-22-in. and 35-in. diameter by 18-in. stroke and two multitubular Scotch Marine type boilers of a working pressure of 200 lbs. per square inch fitted with forced draft. Exhaust steam Feed water heater, Cromptons Ash hoist, Weirs feed pumps, two independent Steam dynamo sets, independent Air pump. Circulating pump, General service pumps, Sanitary pumps and Bilge pumps are fitted in the engine room.



Launching of the "Pao Wo"

The deck machinery includes a steam windlass and capstan forward, a steam capstan aft. Steam steering gear controlled by Telemotor gear is placed aft above the twin rudders and two independent sets of hand steering gear, spirit compass and auxiliary control for steam steering gear are placed aft on the Bridge deck.

Cargo handling gear includes two 5-ton silent type steam winches and steel derricks arranged at the twin masts forward. Four steam wall winches are placed in the 'tween decks for working cargo from main holds and a large steam driven duplex oil pump is placed in the 'tween deck space with a discharging and loading capacity of 100 tons per hour, convenient to the four separate oil tanks—each oil tank carries 100 tons of bulk oil fitted with steam heating coils.

Motorship "Tarakan" for Far East Trade

There was launched on July 9 from the Fijenoord yard of the Wilton-Fijenoord, the cargo motorship *Tarakan*, now under construction for the Nederland Steamship Company, of Amsterdam.

Built under the supervision of the owners' technical staff to the highest class of Lloyd's Register, and to comply with all the requirements of the Netherlands Shipping and Labor Inspection for carrying a large number of native pilgrims, the ship is of 465 feet length between perpendiculars, 62 feet breadth, and 36 feet 3 inches depth, and of 9,230 gross register tons. She will be propelled by an eight cylinder, single-acting, two-stroke cycle Fijenoord M.A.N. diesel engine, developing 7,000 s.h.p. at 195 revolutions per minute, the cylinders having a diameter of 820 mm., and a stroke of 1,440 mm. The scavenging air pump and air compressor are direct driven.

All auxiliaries are driven by electricity, the current being supplied by four diesel generators, each of 180 kilowatts capacity at 325 revolutions per minute. The generators are driven by six-cylinder, single-acting, four-stroke cycle Fijenoord M.A.N. engines with cylinders of 275 mm. diameter by 420 mm. stroke.

New Dutch East Indies Motor Cargo Vessel Launched

On July 19, the single-screw cargo motor vessel *Tawali*, building for Messrs. N. V. Stoomvaart Maatschappij Nederland, and intended for the express cargo service to the Dutch East Indies, was launched from the yard of the Nederland Shipbuilding Company, Limited, (Nederlandsche Scheepsbouw-Maatschappij, Amsterdam).

The following are the principal dimensions of the *Tawali*:—Length, 490 feet; breadth, 62 feet 2½ inches; depth, 36 feet 5 inches with a carrying capacity of about 10,000 tons. The vessel is of the full scantling type, with forecastle, bridge, and poop, and is especially arranged for the carriage of a great number of pilgrims.

There are five holds and a deep tank behind the motor-room. The lower part of two holds is specially arranged for the carriage of palm oil. The vessel has been equipped with one derrick of 40 tons, one of 20 tons, one of 16 tons, and eleven of three to six tons, and six cranes. The winches and further auxiliaries are all electrically driven. The vessel is propelled by a Werkspoor-Sulzer motor of 7,000 b.h.p. built in by Messrs. Nederlandsche Dok-Maatschappij N. V. (Netherland Graving Docks, Limited) giving the ship a speed of 15 knots.

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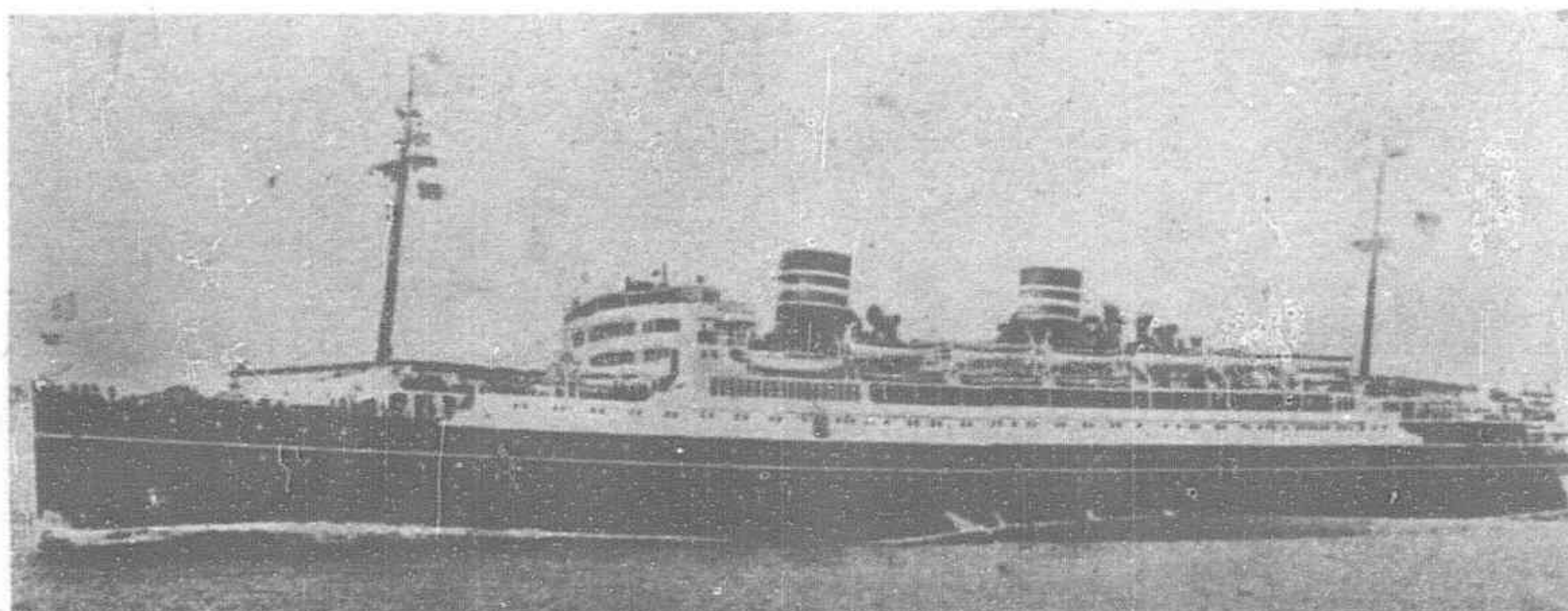
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